

LOOK BEFORE THE LNG LEAP:

Why Policymakers and the Public Need
Fair Disclosure Before Exports of Fracked Gas Start



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EXECUTIVE SUMMARY

Exporting American natural gas to the world market would spur unconventional natural gas production across the country, increasing pollution and disrupting landscapes and communities. Deciding whether to move forward is among the most pressing environmental and energy policy decisions facing the nation. Yet, as the Department of Energy (DOE) considers whether to greenlight gas exports of as much as 45% of current U.S. gas production — more gas than the entire domestic power industry burns in a year — it has refused to disclose, or even acknowledge, the environmental consequences of its decisions. In fact, DOE has not even acknowledged that its own National Energy Modeling System can be used to help develop much of this information, instead preferring to turn a blind eye to the problem. DOE needs to change course. Even much smaller volumes of export have substantial environmental implications and exporting a large percentage of the total volume proposed would greatly affect the communities and ecosystems across America. The public and policymakers deserve, and are legally entitled to, a full accounting of these impacts.

Gas exports are only possible because of the unconventional natural gas boom which hydraulic fracturing (“fracking”) has unlocked. DOE’s own advisory board has warned of the boom’s serious environmental impacts. DOE is charged with determining whether such exports are in the public interest despite the damage that would result. To do that, it needs a full accounting of the environmental impacts of increasing gas production significantly to support exports.

These environmental considerations include significant threats to air and water quality from the industry’s wastes, and the industrialization of entire landscapes. Gas production is associated with significant volumes of highly-contaminated

wastewater and the risk of groundwater contamination; it has also brought persistent smog problems to entire regions, along with notable increases in toxic and carcinogenic air pollutants. Regulatory measures to address these impacts have been inadequate, meaning that increased production very likely means increased environmental harm. Natural gas exports also have important climate policy implications on several fronts: Even if exported gas substitutes for coal abroad (which it may or may not do), it will not produce emissions reductions sufficient to stabilize the climate, and gas exports will increase our investment in fossil fuels. Moreover, the gas export process is particularly carbon-intensive, and gas exports will likely raise gas prices domestically, increasing the market share of dirty coal power, meaning that perceived climate benefits may be quite limited if they exist at all. The upshot is that increasing gas production comes with significant domestic costs.

The National Environmental Policy Act (NEPA) process is designed to generate just such an analysis. NEPA analyses, properly done, provide full, fair, descriptions of a project’s environmental implications, remaining uncertainties, and alternatives that could avoid environmental damage. A full NEPA environmental impact statement looking programmatically at export would help DOE and the public fairly weigh these proposals’ costs and benefits, and to work with policymakers at the federal, state, and local levels to address any problems. In fact, the U.S. Environmental Protection Agency has repeatedly called for just such an analysis. Without one, America risks committing itself to a permanent role as a gas supplier to the world without determining whether it can do so safely while protecting important domestic interests.

Equally troublingly, even as DOE has thus far failed to fulfill its obligation to protect the public interest

by weighing environmental impacts, it risks losing its authority altogether. A drafting quirk in the export licensing statute intended to speed gas imports from Canada means that DOE must grant licenses for gas exports to nations with which the United States has signed a free trade agreement which includes national treatment of natural gas. This rubber-stamp applies even if the proposed exports would not otherwise be in the public interest. As the U.S. negotiates a massive trade agreement which may include nations hungry for U.S. exports, the Trans-Pacific Partnership, this mandatory rubber-stamp risks undercutting DOE's ability to protect the public.

The bottom line is that before committing to massive gas exports, federal decisionmakers need to ensure that they, and the public, have the environmental information they need to make a fair decision, and the authority to do so. That means ensuring that a full environmental impact statement discloses exports' impacts and develops alternatives to reduce them. It also means defending DOE's prerogatives against the unintended effects of trade pacts. Congress and the U.S. trade negotiators must ensure that agreements like the Trans-Pacific Partnership are designed to maintain DOE's vital public interest inquiry.

Gas exports would transform the energy landscape and communities across the country. We owe ourselves an open national conversation to test whether they are in the public interest. We need to look before we leap.

I. Introduction

For the first time ever, the United States has the ability to become a major natural gas exporter, but that possibility comes with substantial economic and environmental risks. The huge volumes of natural gas proposed for export as liquefied natural gas (LNG) would raise domestic energy prices and require a significant expansion of unconventional gas production using hydraulic fracturing (“fracking”).

This shift in the energy landscape raises serious questions: What will export-induced production mean for people living in the gas fields? What will it mean for utilities weighing coal and gas prices as they chart the future of their generation fleets? What it will mean for environmental regulators seeking to manage risk? What will it mean for our air and water quality? What will it mean for climate policy if we increase the extraction and use of this fossil fuel? In the end, are exports worth higher prices and more pollution from fracked gas?

The policy debate continues, but without crucial information: Incredibly, neither the Department of Energy (“DOE”)’s Office of Fossil Energy nor the Federal Energy Regulatory Commission (“FERC”), which share responsibility over LNG export proposals under the Natural Gas Act, have completed a full assessment of the environmental risks associated with export and the expanded gas production needed to support it. The agencies could do so using publicly available information and modeling systems, but have so far refused, implausibly insisting that it is impossible to predict *any* upstream impacts from expanded LNG exports.

For more than forty years, Congress has directed federal agencies to use the National Environmental Policy Act (NEPA)’s environmental impact statement process to address environmental decisions like this one. The NEPA process allows agencies to generate comprehensive data, weigh alternatives, and expose assumptions to public scrutiny, so they can base decisions on a fully developed analysis of the impacts of a proposed activity. Amidst the ongoing raucous public debate on export, the information NEPA can provide is not just legally required, but sorely needed.

DOE and FERC have failed to provide this critical analysis. Only one LNG export proposal, for a terminal at Sabine Pass on the Louisiana-Texas border, has moved most of the way through the federal licensing process. FERC, which focuses largely on terminal siting, refused to consider any of the upstream consequences of Sabine Pass’s plan to export 2.2 billion cubic feet of gas every day.² It did so even though Sabine Pass’s export application trumpets that the project intends to “play an influential role in contributing to the growth of natural gas production in the U.S.” and relies substantially on this point to argue that the project is in the public interest.³ DOE followed suit, adopting FERC’s analysis to support its own public interest determination, while maintaining that the induced gas production necessary to support export is not

² FERC, *Order Granting Section 3 Authorization [to Sabine Pass]*, 139 FERC ¶ 61,039 (Apr. 16, 2012).

³ Sabine Pass Export Application at 56, DOE/FE Docket 10-111-LNG (Sept. 7, 2010).

“reasonably foreseeable,” and so warrants no consideration.⁴ DOE recently announced that it would take time to consider whether to stand by this decision, but it has not yet reversed course.⁵

Thus, even while authorizing a proposal which, on its own, would increase U.S. gas exports by more than 50% annually,⁶ and which explicitly relies on increased natural gas production to support itself, the federal decisionmakers charged with protecting the public interest were asleep at the switch. Even though export proponents themselves advertise that their projects will drive unconventional natural gas production, DOE and FERC are willfully blind to this major impact. This position is particularly untenable because the National Energy Modeling System (NEMS) which the Energy Information Administration (“EIA”) within DOE administers, is designed to project changes in gas production caused by new demand, and could therefore predict precisely the production-level impacts which DOE and FERC insist cannot be foreseen at all.⁷

Instead, applications to export more than ten times the gas which was authorized in the Sabine Pass matter are moving forward in a piecemeal terminal-by-terminal licensing process which has not provided any meaningful analysis of the national and regional environmental challenges linked to export. This ongoing legal and policy failure warrants immediate correction.

Not only have DOE and FERC failed to provide a proper accounting, they may lose even their authority to do so if a controversial trade agreement now under negotiation is finalized. That deal, the Trans-Pacific Partnership (“TPP”), could further liberalize trade with much of the Pacific Rim, including major natural gas importers like Japan. Thanks to a little-known provision of the Natural Gas Act, it could also remove federal oversight of LNG exports. Twenty years ago, in an effort to speed Canadian gas imports, Congress provided that LNG shipments between countries with which the U.S. has a free trade agreement were to be automatically granted. Although Congress never anticipated massive LNG exports, that same provision could nonetheless remove DOE and FERC’s discretion to weigh whether huge volumes of export are in the public interest, or to meaningfully regulate the process. Yet neither agency has insisted that TPP negotiators protect this critical federal authority.

For communities across the country, therefore, the future is in real question. If LNG export goes forward, they will experience a surge of unconventional new gas production, along with all

⁴ DOE, *Final Opinion and Order Granting Long-Term Authorization to Export Liquefied Natural Gas from Sabine Pass LNG Terminal to Non-Free Trade Agreement Nations*, FE Docket No. 10-111-LNG (Aug. 7, 2012).

⁵ See DOE, *Order Granting Rehearing for Further Consideration*, FE Docket No. 10-111-LNG (Oct. 5, 2012).

⁶ See EIA, *U.S. Natural Gas Imports & Exports 2011* (July 18, 2012). The U.S. now exports about 1,500 billion cubic feet “bcf” of natural gas annually, with the vast majority travelling by pipeline to Mexico and Canada. Sabine Pass would export 2.2 bcf/day, or 803 bcf annually.

⁷ See, e.g., EIA, *The National Energy Modeling System: An Overview* (2009) at 54-55 (explaining that NEMS contains “play-level” production models for each unconventional natural gas play and projects production based on demand); 59-62 (transmission and distribution module of NEMS allocates demand based through modeling the transmission network and can account for imports and exports).

the environmental burdens of the boom that are outlined below. If DOE and FERC do not analyze and disclose these impacts, neither they or state and local governments can weigh whether they are in the public interest, or take action to lessen them. And if the TPP and pacts like it are signed without due reflection and before a full NEPA environmental impact statement is available, the U.S. will be locked into a future of gas export without ever having considered the cost.

It is not yet too late to change course. DOE has committed not to release any more export licenses until an economic study has been finalized, which will not occur until this winter. Negotiations for the TPP have not concluded. FERC has not sited any more new terminals. So, although the United States has begun to edge into exports, that future has not yet been chosen. Cooler heads can still prevail, and decisionmakers can develop the information we and they so clearly need.

II. The Magnitude of the Export Boom

Even if only some of the 19 export projects now before DOE are approved, they would, once operational, transform the domestic energy market and greatly increase unconventional natural gas production. There is no domestic precedent for changes of the magnitude which DOE is now considering.

Before the shale gas boom began, the U.S. exported almost no gas beyond Canada and Mexico, and even those North American exports were not very large. In 2006, for instance, the U.S. exported a total of 723.9 bcf per year of natural gas, with 663 of that by pipeline.⁸ Only the remaining approximately 60 bcf per year are exported as LNG, essentially all of it going to Japan from a single Alaskan terminal, with a few bcf to Mexico by truck.⁹ Policymakers largely assumed that this pattern would continue, urging that the U.S. develop gas *import* capacity to accommodate growing domestic demand.¹⁰

The situation now is very different. Projections of abundant domestic natural gas from unconventional, largely shale, plays has dropped domestic gas prices to record lows while prices abroad remain high. As a result, U.S. pipeline exports have risen, pushing total exports over 1,500 bcf per year (or about 4 bcf per day), and investors have flooded DOE with an ever-growing number of export proposals. As of late October 2012, the 19 different export projects before DOE proposed to export as much as 28.39 bcf *per day* of LNG.¹¹ Of this, 23.71 bcf per day was proposed for export to countries with which the U.S. has not signed a free trade

⁸ EIA, U.S. Natural Gas Exports by Country, *available at*: http://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm.

⁹ *See id.*

¹⁰ *See, e.g.,* National Petroleum Council, *Balancing Natural Gas Policy: Fueling the Demands of a Growing Economy* at 36-40 (2003)

¹¹ Department of Energy Office of Fossil Energy, *Applications Received by DOE/FE to Export Domestically Produced LNG from the Lower-48 States (as of October 26, 2012)*, *available at* http://www.fossil.energy.gov/programs/gasregulation/reports/Long_Term_LNG_Export_10-26-12.pdf. Other proposals to export at least 2.5 bcf/d of LNG have also been reported, but have not yet been filed with DOE.

agreement providing for national treatment of natural gas; DOE has clear authority to disapprove such proposals if they are not in the public interest.

How much gas is 28.39 bcf per day? It is equivalent to 10,362 bcf per year. By comparison, the entire country produced just 23,000 bcf in 2011, meaning that exports equivalent to about 45% of domestic production are now before DOE.¹³ Exporting this much gas would be bound to strongly affect domestic gas production and consumption patterns. For example, the country consumed 24,316 bcf of gas last year – slightly more than it produced, with imports making up much of the difference.¹⁴ Dedicating forty percent of U.S. gas production to export would, therefore, cause big shifts in the domestic market. The amount of gas slated for export is considerably more than the 7,602 bcf that the entire electric power sector used last year, and nearly twice as much gas as was used for electricity by every home in the country.¹⁵ If this amount of gas is exported, the United States must produce more gas, use less, or do both.

The Energy Information Administration (“EIA”) has come to just that conclusion in a DOE-commissioned January 2012 report, which estimated that about two-thirds (63%) of export demand will be met by increased production, rather than by decreases in gas consumption elsewhere in the economy.¹⁶ That new production, in turn, will come almost entirely (93%) from unconventional gas plays, and so will be produced by fracking.¹⁷

Thus, if the DOE authorizes all of the 10,362 bcf of exports now before it, about 63% of that exported gas, or 6,528 bcf, would likely be from new production, and 6,397 bcf of that new production would be fracked gas. Total domestic gas production would increase by 27%.

To be sure, there are legitimate questions as to the real scope of the export boom. The global LNG market may be hungry for U.S. gas, but limits on near-term demand and regasification capacity may mean that not every export terminal will be built, or operate at capacity. On the other hand, the scramble for export licenses shows no signs of diminishing. In fact, the pace and intensity of this export boom seems to have caught decisionmakers by surprise. In January 2012, DOE and the EIA assumed that exports of 12 bcf/d were at the high end of possible export futures.¹⁸ Export applications for more than double that volume have now been lodged with DOE. The “high end” scenario now looks decidedly mid-range compared to pending applications.¹⁹

¹³ EIA, Natural Gas Monthly November 2012, Table 1 (volume reported is dry gas).

¹⁴ *Id.*, Table 2.

¹⁵ *Id.* (electric power sector gas use in 2011 was 7,602 bcf; residential use was 4,730 bcf).

¹⁶ EIA, *Effects of Increased Natural Gas Exports on Domestic Energy Markets* (Jan. 2012) at 6, 10-11.

¹⁷ *Id.* at 11.

¹⁸ EIA, *Effects of Increased Natural Gas Exports on Domestic Energy Markets* at 1.

¹⁹ In its Annual Energy Outlook for 2012, EIA very conservatively projects that only 2.2 bcf/d of LNG will be exported by 2035, noting that this projection is subject to considerable regulatory uncertainty. See EIA, *Annual Energy Outlook* (2012) at 94. This amount would correspond to about a 470 bcf annual increase in unconventional natural gas production – about a 2% national increase. Notably, the 2.2 bcf of annual LNG export EIA conservatively projects are equivalent to the export proposed by the Sabine Pass facility which DOE has already all

Moreover, even a much smaller gas export increase would still mean major changes in the U.S. gas market. If only one-quarter of the proposed projects move forward, about 6 bcf/d of gas would still be exported – the equivalent of 2,190 bcf annually. That demand would, in turn, be accompanied by about 1,172 bcf of new unconventional gas production if the EIA is correct, increasing U.S. gas production overall by 5%.

Proposed export terminal sites are on all three U.S. sea coasts. Most applications are focused on the Gulf Coast, but applicants have also filed to export from Atlantic coastal sites in Maryland and Georgia and from Pacific coastal sites in Oregon. Between the terminals themselves, the pipelines required to feed them with gas, the barge traffic they will engender and, of course, the fracking boom they will support and extend, few regions of the United States will be untouched by LNG export.

III. Environmental Implications of Export

Producing and exporting large volumes of natural gas will have significant environmental implications that are best evaluated in the NEPA process with an Environmental Impact Statement. The urgency of a comprehensive look is clear from an examination of a subset of those effects: impacts associated directly with increasing gas production, impacts from changes in the gas market associated with export, and impacts associated with export itself, particularly its implications for climate change.

A. The Environmental Impacts of Increased Unconventional Gas Production

While the DOE's Office of Fossil Energy continues to consider pending export applications, the Secretary of Energy Advisory Board has been sounding the alarm about the fracking process on which export depends. Its Shale Gas Production Subcommittee issued a detailed set of recommendations in late 2011, emphasizing that a substantially enhanced regulatory and research effort is needed to ensure that unconventional natural gas production can move forward safely.

The Subcommittee, composed of nationally-regarded independent experts, wrote that it "believes that if action is not taken to reduce the environmental impact accompanying the very considerable expansion of shale gas production expected across the country – perhaps as many as 100,000 wells over the next several decades – there is a real risk of serious environmental consequences causing a loss of public confidence that could delay or stop this activity."²⁰ As of late 2011, the Subcommittee warned that "progress to date is less than the Subcommittee

but approved. The EIA projection thus functionally assumes that *none* of the other projects now before DOE are built. While that might occur, it is obviously prudent to consider the impacts of other projects.

²⁰ Secretary of Energy Advisory Board Shale Gas Production Subcommittee ("SEAB"), *Second-Ninety Day Report* (Nov. 18, 2011) at 10.

hoped.”²¹ It cautioned that “some concerted and sustained action is needed to avoid excessive environmental impacts of shale gas production and the consequent risk of public opposition to its continuation and expansion.”²²

As the Subcommittee recognized, the impacts of unconventional gas production stretch across multiple mediums and contexts. Its recommendations identify areas for improvement in managing air pollution, water pollution, subsurface contamination, land use, and community impacts.²³ The Subcommittee also issued an urgent call for improved transparency and disclosure throughout the process, and for greatly enhanced research and development to better understand and improve production processes.²⁴

Significant environmental impacts associated with unconventional natural gas production, and hence with export, include the following:

Air Pollution

Natural gas production has significant air quality impacts. As the DOE’s Shale Gas Subcommittee summarized the matter last August:

Shale gas production, including exploration, drilling, venting/flaring, equipment operation, gathering, accompanying vehicular traffic, results in the emission of ozone precursors (volatile organic compounds (VOCs), and nitrogen oxides), particulates from diesel exhaust, toxic air pollutants and greenhouse gases (GHG), such as methane.

As shale gas operations expand across the nation these air emissions have become an increasing matter of concern at the local, regional and national level. Significant air quality impacts from oil and gas operations in Wyoming, Colorado, Utah and Texas are well documented, and air quality issues are of increasing concern in the Marcellus region (in parts of Ohio, Pennsylvania, West Virginia and New York).²⁵

The tight link between gas production and ground-level ozone, or smog, is a particularly pressing problem. The gas industry is a major source of two major ozone precursors: VOCs and NO_x.²⁶ Smog harms the respiratory system and has been linked to premature death, heart

²¹ *Id.*

²² *Id.*

²³ *Id.* at Annex C.

²⁴ *Id.*

²⁵ SEAB, *First Ninety Day Report* (August 18, 2011) at 15.

²⁶ See, e.g., Al Armendariz, *Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements* (Jan. 26, 2009), available at http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf (hereinafter “Barnett Shale Report”).

failure, chronic respiratory damage, and premature aging of the lungs.²⁷ Smog may also exacerbate existing respiratory illnesses, such as asthma and emphysema, or cause chest pain, coughing, throat irritation and congestion. Children, the elderly, and people with existing respiratory conditions are the most at risk from ozone pollution.²⁸

As a result of significant VOC and NO_x emissions associated with oil and gas development, numerous areas of the country with heavy concentrations of drilling are now suffering from serious ozone problems. For example, the Dallas Fort Worth area in Texas is home to substantial oil and gas development. Within the Barnett shale region, as of July 2012, there were 16,213 gas wells and another 2,764 wells permitted.²⁹ Of the nine counties surrounding the Dallas Fort Worth area that EPA has designated as in “nonattainment” with national air quality standards for ozone, five contain significant oil and gas development.³⁰ A 2009 study found that summertime emissions of smog-forming pollutants from gas production in these counties were roughly comparable to emissions from all the cars in those same areas.³¹ These nonattainment designations are particularly striking because the current ozone standard is set below the level EPA’s own scientific advisors recommend as adequate to protect public health.³² That gas production emissions can cause violations even of this relatively *lax* standard underlines their severity.

Oil and gas development has also brought serious ozone pollution problems to rural areas, such as western Wyoming.³³ On March 12, 2009, the governor of Wyoming recommended that EPA designate Wyoming’s Upper Green River Basin as an ozone nonattainment area under EPA’s current ozone.³⁴ The Wyoming Department of Environmental Quality conducted an extended assessment of the ozone pollution problem and found that it was “primarily due to local emissions from oil and gas . . . development activities: drilling, production, storage, transport, and treating.”³⁵ In the winter of 2010-2011, the residents of Sublette County suffered thirteen

²⁷ See, e.g., Jerrett *et al.*, *Long-Term Ozone Exposure and Mortality*, New England Journal of Medicine (Mar. 12, 2009), available at <http://www.nejm.org/doi/full/10.1056/NEJMoa0803894#t=articleTop>.

²⁸ See EPA, *Ground-Level Ozone, Health Effects*, available at <http://www.epa.gov/glo/health.html>; EPA, *Nitrogen Dioxide, Health*, available at <http://www.epa.gov/air/nitrogenoxides/health.html>.

²⁹ Texas Railroad Commission, <http://www.rrc.state.tx.us/data/fielddata/barnettshale.pdf> (Accessed Sept. 25, 2012).

³⁰ Barnett Shale Report at 1, 3.

³¹ *Id.* at 1, 25-26.

³² See, e.g., Elizabeth Shogren, NPR, *EPA Seeks to Tighten Ozone Standards* (July 24, 2011) (when EPA set the current standards it “ignored the advice of its own panel of outside scientific advisers”). EPA has since opted not to immediately update the out-dated standards, but revisions may be forthcoming next year.

³³ Schnell, R.C, et al. (2009), “Rapid photochemical production of ozone at high concentrations in a rural site during winter,” *Nature Geosci.* 2 (120 – 122). DOI: 10.1038/NGEO415.

³⁴ See Letter from Wyoming Governor Dave Freudenthal to Carol Rushin, Acting Regional Administrator, USEPA Region 8, (Mar. 12, 2009) (“Wyoming 8-Hour Ozone Designation Recommendations”), available at <http://deq.state.wy.us/out/downloads/Rushin%20Ozone.pdf>; Wyoming Department of Environmental Quality, Technical Support Document I for Recommended 8-hour Ozone Designation of the Upper Green River Basin (March 26, 2009) (“Wyoming Nonattainment Analysis”), at vi-viii, 23-26, 94-05, available at http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf.

³⁵ Wyoming Nonattainment Analysis at viii.

days with ozone concentrations considered “unhealthy” under EPA’s current air-quality index, including days when the ozone levels exceeded the worst days of smog pollution in Los Angeles.³⁶

As oil and gas production moves into new areas ozone problems are likely to follow. For example, regional air quality models predict that gas development in the Haynesville shale will increase ozone pollution in northeast Texas and northwest Louisiana and may lead to violations of ozone air quality standards.³⁷ Experts also anticipate air quality problems associated with development of the Marcellus shale in the Mid-Atlantic region.³⁸

Ozone pollution is not the only danger associated with natural gas production, however. Toxic air emissions are also a significant concern. Emissions from gas fields contain carcinogenic compounds, including benzene, which are associated with significant increases in cancer risk. In fact, Colorado researchers sampling the air near a field there recently determined that residents living within half a mile of from wells were at increased risk of cancer, compared to those living further away, due to long-term exposure to toxic leaks.³⁹ As the industry expands, this toxic problem will come with it.

In addition to these serious problems, the industry poses a significant threat to the global climate. The natural gas industry is also among the very largest sources of methane pollution in the country. Methane is a potent greenhouse gas, and these emissions rank the industry as the second largest industrial greenhouse gas source, second only to power production.⁴⁰ Because fracking operations tend to produce substantially more methane, and are also supporting new well development across the country, unconventional natural gas production is increasing these emissions. EPA has recently estimated annual industry methane emissions as the equivalent of 328 million metric tons of CO₂.⁴¹

This pollution will remain a serious danger even though EPA has recently finalized its first attempt at comprehensive air pollution controls for the industry.⁴² While these standards will

³⁶ EPA, *Daily Ozone AQI Levels in 2011 for Sublette County, Wyoming*, available at http://www.epa.gov/cgi-bin/broker?msaorcountyName=countycode&msaorcountyValue=56035&poll=44201&county=56035&msa=-1&sy=2011&flag=Y&_debug=2&_service=data&_program=dataprog.trend_tile_dm.sas; see also Wendy Koch, *Wyoming's Smog Exceeds Los Angeles' Due to Gas Drilling*, USA Today, available at <http://content.usatoday.com/communities/greenhouse/post/2011/03/wyomings-smog-exceeds-los-angeles-due-to-gas-drilling/1>.

³⁷ See Kembell-Cook et al., *Ozone Impacts of Natural Gas development in the Haynesville Shale* 44 Environ. Sci. Technol. 9357, 9362 (Nov. 18, 2010).

³⁸ Elizabeth Shogren, *Air Quality Concerns Threaten Natural Gas's Image*, National Public Radio (June 21, 2011), available at <http://www.npr.org/2011/06/21/137197991/air-quality-concerns-threaten-natural-gas-image>.

³⁹ See generally Lisa McKenzie et al., *Human health risk assessment of air emissions from development of unconventional natural gas resources*, Sci. Total Environment (May 2012), abstract available at: <http://www.ncbi.nlm.nih.gov/pubmed/22444058>.

⁴⁰ See EPA, *Inventory of US Greenhouse Gas Emissions and Sinks 1990-2010* (2012).

⁴¹ See 74 Fed. Reg. 52,738, 52,756 (Aug. 23, 2011).

⁴² See 77 Fed. Reg. 49,490 (Aug. 16, 2012).

play a significant role in reducing air pollution from new infrastructure, many new sources and existing infrastructure escape regulation. Moreover, the standards do not regulate methane directly. As a result, air pollution from production will continue to be a serious problem, despite this important first regulatory effort.

Water Pollution

Much public concern over expanded fracking operations has focused on water pollution, and with good reason. Significant water resource impacts can occur throughout the production process.

Fracking requires large volumes of water per well. While operators have sought to reduce their water demands in some areas, numerous sources indicate that fracturing a single well requires at least 1 to 5 million gallons of water.⁴³ Water withdrawals can harm aquatic ecosystems and human communities by reducing instream flows—especially in small headwaters streams -- and by harming aquatic organisms at water intake structures.⁴⁴ Where water is withdrawn from aquifers rather than surface sources, withdrawal risks permanent depletion.⁴⁵ Withdrawals for fracking pose a greater risk than other withdrawals, because fracking is a consumptive use. Fluid injected during the fracking process is ideally deposited below freshwater aquifers and into sealed formations, so much of it never returns to the surface.

The well-site management of fracking fluid and wastes, including flowback water, poses water quality risks throughout the process. Spills at the surface, leaks through well casings, and contaminant migration from the fracking site itself can all contaminate ground and surface water.

Fracturing fluid itself contains many chemicals that present health risks. Diesel fuel and similar compounds pose particularly pressing risks. The DOE Subcommittee singled out diesel for its harmful effects and recommended that it be banned from use as a fracturing fluid additive.⁴⁶ The minority staff of the House Committee on Energy and Commerce determined that despite diesel's risks, between 2005 and 2009, "oil and gas service companies injected 32.2 million gallons of diesel fuel or hydraulic fracturing fluids containing diesel fuel in wells in 19 states."⁴⁷

Fracking fluids are not the only source of potential contamination.⁴⁸ Fluid naturally occurring in the target formation "may include brine, gases (e.g. methane, ethane), trace metals, naturally occurring radioactive elements (e.g. radium, uranium) and organic compounds."⁴⁹ Inadequate

⁴³ See, e.g., SEAB, *First Ninety-Day Report* at 19; NY RDSGEIS 6-10.

⁴⁴ NY RDSGEIS at 6-3, 6-4.

⁴⁵ *Id.* 6-5; SEAB, *First Ninety Day report* at 19 ("[I]n some regions and localities there are significant concerns about consumptive water use for shale gas development.").

⁴⁶ *Id.* at 25.

⁴⁷ Letter from Reps. Waxman, Markey, and DeGette to EPA Administrator Lisa Jackson (Jan. 31, 2011) at 1.

⁴⁸ NY RDSGEIS at 5-75 to 5-78

⁴⁹ SEAB *First Ninety-Day Report* at 21.

well cementing, among other faults, can allow these substances to contaminate groundwater resources.⁵⁰ Storage, transport, and treatment of produced water on the surface create risks of spills and inadequate disposal, providing another vector for contamination of surface and groundwater resources.⁵¹

Properly treating these waste products, and other production waste, is essential to protecting water quality. Limited treatment capacity and the challenges of safely using underground injection as an alternative disposal method for large volumes of waste are pressing problems. Treating and discharging extremely salty, highly-contaminated wastewater is energy-intensive and technically difficult, and can put surface streams at risk. Meanwhile, injection also faces challenges, as not all regions have substantial injection capacity and injection wells themselves have been associated with earthquakes of up to 4.0 on the Richter scale.⁵²

Finally, sediment contamination associated with the significant land disturbance and construction activities needed to construct and manage a well field is a persistent challenge. Run-off from production sites can readily contaminate streams without careful management.

Incidents of water contamination from various phases of the production process have been widely reported. Although EPA, other federal agencies and some states have begun to move forward with regulatory responses, many of these challenges remain unresolved. Thus, increased gas production for export will be accompanied by increasing risks of water pollution.

Land and Community Impacts

Intense gas production can transform entire regions. The gas boom means hundreds of thousands of new wells, along with the vast infrastructure of roads, pipelines, and support facilities they require. This landscape-level industrialization can transform formerly rural areas into vast construction sites, with thousands of trucks moving down an expanding webwork of gravel roads. This landscape change, too, is a significant environmental impact of increasing gas production.

The scope of potential change is great. Each well pad alone occupies roughly 3 acres, and associated infrastructure (roads, water impoundments, and pipelines) more than doubles this figure.⁵³ Many of these acres remain disturbed through the life of the well, estimated to be 20 to 40 years.⁵⁴ This directly disturbed land is generally no longer suitable as wildlife habitat. *Id.* at 6-68. In addition to this direct disturbance, indirect habitat loss occurs as areas around the directly disturbed land lose essential habitat characteristics. As New York regulators, for

⁵⁰ *Id.* at 20.

⁵¹ See NY RDSGEIS at 1-12 (describing risks of fluid containment at the well pad).

⁵² See, e.g., Columbia University, Lamont-Doherty Earth Observatory, *Ohio Quakes Probably Triggered by Waste Disposal Well, Say Seismologists* (Jan. 6, 2012); Alexis Flynn, *Study Ties Fracking to Quakes in England*, Wall Street Journal (Nov. 3, 2011).

⁵³ NY RDSGEIS at 5-5.

⁵⁴ *Id.* at 6-13.

instance, report, “[r]esearch has shown measureable impacts often extend at least 330 feet (100 meters) into forest adjacent to an edge.”⁵⁵

These effects will harm rural economies and decrease property values, as major gas infrastructure transforms and distorts the existing landscape. United States Geological Survey researchers, reviewing recent patterns of unconventional gas extraction, combined with coalbed methane projects, report that these activities create “potentially serious patterns of disturbance on the landscape.”⁵⁶

Pennsylvania presents a particularly striking example of the many ways in which gas production can transform a landscape. A recent state study of drilling in Pennsylvania’s hitherto relatively undisturbed forest lands found that the forests have been so thoroughly fragmented and disrupted by the influx of gas activity that “zero” remaining acres of the state forests are suitable for further leasing with surface disturbing activities.⁵⁷

Increased gas production for export can be expected to intensify and extend these impacts to new regions as drilling continues to meet increased demand.

Summary

The environmental impacts of increasing gas production of course extend well beyond those captured by this short summary. There are real environmental risks inherent in every phase of gas’s life-cycle, from site preparation to drilling to waste disposal. Greatly increasing gas demand will increase the scope and intensity of these risks. The DOE’s Shale Gas Subcommittee has already found that our regulatory infrastructure is not adequate to manage these risks at their current level of intensity. The United States is even less prepared for a greater and more rapid expansion of natural gas extraction.

B. Environmental Impacts Due to Fuel Market Shifts

Increasing demand for gas will necessarily raise gas and energy prices. These price effects have important environmental impacts as well because changing gas prices and availability affects the domestic fuel market. If natural gas is relatively more expensive, utilities, in particular, may be more likely to use competing fuels and generation technologies, each of which has its own environmental implications.

The prospect that LNG exports could incentivize domestic coal-fired generation is particularly important to understand. Coal-fired generation is a major source of many air pollutants,

⁵⁵ *Id.* at 6-75.

⁵⁶ E.T. Slonecker *et al.*, USGS, *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004–2010* (2012) at 1.

⁵⁷ PA DCNR, *Impacts of Leasing Additional State Forest for Natural Gas Development* (2011).

including asthma-inducing SO₂, and among the very largest sources of combustion-related CO₂. Thus, LNG-induced market changes could have important implications for domestic air quality.

The EIA has modeled this fuel-shifting effect for gas exports of up to 12 bcf/d.⁵⁸ It reports that as exports rise, domestic gas consumption falls. Utilities largely switch to coal, while also making up a bit of the displaced gas generation with energy efficiency and renewable energy.⁵⁹ On balance, this shift results in increased emissions because the bulk of the new energy (72% of the total) comes from coal generation.⁶⁰

More coal generation means greater carbon dioxide emissions from combustion, which are more than sufficient to balance out any emissions savings from greater use of efficiency and renewable energy in most of the scenarios that the EIA considered.⁶¹ In fact, even in the few scenarios where the EIA predicted a larger market share for low carbon sources, LNG exports still resulted in a net increase in CO₂ emissions nationally, once emissions from the liquefaction process itself were accounted for.⁶² The size of this increase depends upon the volume and size of exports, and the baseline price of gas and coal under various scenarios, so the EIA analysis estimates it within a broad range of 187 to 1,587 million metric tons of CO₂ over the next twenty years. These are large amounts. Even at the low end, 187 million metric tons is equivalent to the CO₂ emitted in a year by roughly 44 coal-fired power plants.⁶³ These emissions have the potential to increase as more LNG is exported with commensurate impacts on the market. They would be accompanied by corresponding increases in other coal-generation-related air pollutants, like SO₂.

This market-linked pollution effect could work to disrupt important policy work at the national and local level. Many utilities, public service commissions, and environmental regulators increasingly assume that coal generation's market share will steadily fall, in favor of gas, renewable energy, and energy efficiency. These entities are planning accordingly. Indeed, the EPA's recent proposed carbon pollution standards for fossil-fired generation are premised on EPA's understanding that "in light of a number of economic factors, including the increased availability and significantly lower price of natural gas ... few, if any, new coal-fired power plants will be built in the foreseeable future."⁶⁴ As policymakers adapt to a world of more readily-available natural gas, export's tendency to make gas *less* available and more expensive will have important environmental implications throughout the country.

C. Impacts from Export Itself: Focus on Climate

⁵⁸ EIA, *Effects of Increased Natural Gas Exports on Domestic Energy Markets* at 17-19.

⁵⁹ *Id.*

⁶⁰ *Id.* at 18.

⁶¹ *See id.* at 18-19.

⁶² *Id.*

⁶³ Calculated with EPA's *Greenhouse Gas Equivalencies Calculator*, available at <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>.

⁶⁴ *See* 77 Fed. Reg. 22,392, 22,399 (Apr. 13, 2012).

Finally, exports themselves have substantial environmental impacts.

Export terminals are large industrial sites. The liquefaction facilities needed to chill natural gas until it condenses into a liquid well below zero are energy-intensive and can produce substantial amounts of air and water pollution. Likewise, the pipeline and compressor networks needed to transport gas to the terminal, and the international shipping system needed to carry it onward all have significant impacts on the environments they traverse. The highly explosive nature of LNG means that carefully mapping out the potential for serious accidents around terminals and ships is an ongoing and important exercise in worst-case scenario analysis.

Looking more broadly, the use of LNG itself has environmental impacts, both positive and negative. Examining the climate implications of LNG is particularly important because LNG proponents have touted the fuel for its supposed potential to substantially reduce greenhouse gas pollution by displacing coal.

This claim is not well-supported. Because of the energy used to liquefy, transport, and re-gasify LNG, its life-cycle climate footprint is greater than that of most gas sources. Indeed, at least one peer-reviewed study has found LNG's life-cycle greenhouse gas emissions approach the low-end of coal life-cycle emissions.⁶⁵ Notably, that study was based on emissions from conventionally-produced natural gas, which are considerably lower than those from unconventional gas. Other studies, though concluding that LNG emissions are still lower than those of coal, have likewise documented that LNG life-cycle emissions are on the order of 30% greater than those of ordinary gas.⁶⁶ Whichever figures ultimately turn out to be correct, it is clear that LNG is among the most carbon-intensive forms of natural gas.

Further, whether or not LNG produces as much greenhouse gas pollution as coal, increased use of *any* fossil fuel is not consistent with preventing dangerous climate change. Recent climate studies show that increased natural gas use (from whatever source), without aggressive additional carbon control efforts, will not prevent dangerous increases in global temperature. The International Energy Agency, for instance, recently considered a future in which global gas use (including LNG use) sharply increases because of the unconventional gas boom.⁶⁷ In this scenario, despite gas's presumed life-cycle emissions advantage over coal, atmospheric CO₂ concentrations nonetheless rise on a trajectory towards 650 ppm, up from near 400 ppm today, pushing towards a 3.5°C temperature increase.⁶⁸ As a result, even if LNG emits less greenhouse gas pollution than coal, and even if it displaces some amount of coal power (which may or may not occur), it will not put on a path towards safe climate.

⁶⁵ Jaramillo et al., *Comparative Life-Cycle Air Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation*, 41 Environ. Sci. Technol. 6,290, 6,295 (2007).

⁶⁶ See European Commission Joint Research Centre, *Liquefied Natural Gas for Europe – Some Important Issues for Consideration* (2009) at 16-17; European Commission Joint Research Centre, *Climate impact of potential shale gas production in the European Union* (2012).

⁶⁷ International Energy Agency, *Golden Rules for a Golden Age of Gas* (2012).

⁶⁸ *Id.* at 91.

We can only avoid the worst impacts of climate change if emissions fall sharply. As IEA explains, “reaching the international goal of limiting the long-term increase in global mean temperature to 2°C above pre-industrial levels cannot be accomplished through greater reliance on natural gas alone.”⁶⁹ Thus, expanded natural gas exports may, at best, very slightly slow the pace of warming. In the worst case, they will maintain the status quo, while deepening a national and global investment in climate-disrupting fossil fuels and delaying the transition to renewable energy sources.

D. Conclusions on Environmental Impacts

In sum, the environmental impact of LNG export is large, and stretches from local effects near individual gas wells to significant cumulative impacts on the country as gas production increases and gas prices rise to significant shifts in the international energy market. Some of these impacts are better understood than others, but all are worthy of careful analysis.

That analysis has not been forthcoming. DOE and FERC have prepared no environmental reports studying the impacts of export and, worse, have so far declined to do so, as is explained below. Export proponents, who generally trumpet production increases as a central benefit of their projects, are silent on the environmental costs of these production shifts.

The policy community has not yet seriously engaged these questions either. Two much-discussed recent LNG export papers, which generally favor exports, devote almost no attention to the environmental impacts of exports and the increased gas production that would accompany them. A report from the Brookings Institution, titled *Liquid Markets*, cites the DOE’s Shale Gas Subcommittee’s serious concerns and reviews ongoing regulatory initiatives, but makes no effort to quantify the likely environmental impacts of increased production.⁷⁰ Instead, it settles for predicting only that the “current regulatory environment” – the one which DOE has judged to be inadequate – should not put any insuperable hurdles in the way of new drilling.⁷¹

A second report, from Michael Levi of the Council on Foreign Relations and the Hamilton Project, also lacks a detailed treatment of these issues.⁷² The environmental portion of that analysis also largely considers whether public backlash over environmental damage will be sufficient to derail exports, warning that the EIA projects “that a large part of increased production spurred by export demand would be in the Northeast, where opposition to shale gas development has been strongest.”⁷³ Levi views this possibility as an argument for improved regulation, such as the DOE has called for. He implies, however, that because LNG exports will

⁶⁹ *Id.* at 100.

⁷⁰ Brookings Energy Security Initiative, *Liquid Markets: Assessing the Case for U.S. exports of Liquefied Natural Gas* (May 2012) at 6-12.

⁷¹ *Id.* at 11.

⁷² Michael Levi, The Hamilton Project, *A Strategy for U.S. Natural Gas Exports* (June 2012).

⁷³ *Id.* at 20-21.

not commence “for several years,” there will be time to put the necessary rules in place before hand.⁷⁴ Suffice to say that this is back-to-front thinking: There is no guarantee that rules will be in place to manage a wave of increased fracking. On the contrary, with billions of dollars sunk into export terminals, one might expect export proponents to oppose new regulation.

These two recent reports are representative: There has been a great deal of discussion of the economic potential of LNG exports, but the environmental discussion has lagged dangerously behind. Mere assertions that environmental impacts will not be sufficiently disturbing as to cause a massive public backlash, or that regulations will doubtless be in place by the time exports occur, are not enough to support careful consideration of these transformative changes. The decision to allow substantial LNG exports requires a thorough accounting of the likely impacts and how they can best be managed.

To be sure, a great deal of useful information is being developed on the environmental impacts of unconventional gas production generally, as state and federal regulators grapple with the implications of the boom. That information, however, has not been integrated into an analysis of the impacts of LNG exports or used to inform export decisions. If DOE or FERC began that study, they would find a rich and developing literature to draw upon and synthesize. The export licensing system, supported by the NEPA process, should produce just an analysis. That information is long overdue.

IV. The Regulatory Infrastructure

The Natural Gas Act and NEPA provide a framework under which DOE and FERC must weigh the environmental impacts of export, and then ensure that exports, if any, are regulated to protect the public interest. Thus far, this fundamental oversight machinery has not been fully used.

Natural gas imports and exports have been regulated under the Natural Gas Act since the late 1930s. Until very recently, however, large-scale exports of LNG were not in the picture. The two core regulatory bodies, DOE’s Office of Fossil Energy, and FERC, dealt largely with pipeline shipments to Canada and Mexico and with LNG import terminals. Although they occasionally handled periodic permit renewals for a sole, small, LNG export terminal in Alaska that has served the Asian market off and on since the 1960s, this minor project does not remotely compare to the enormous export proposals now before them. This striking shift underlines the importance of proceeding carefully now.

A. The Public Interest Determination and Siting Process

The Natural Gas Act provides that “no person” may export or import natural gas without a license.⁷⁵ Such a license will be granted unless the proposal “will not be consistent with the

⁷⁴ See *id.* at 21.

⁷⁵ 15 U.S.C. § 717b(a).

public interest.”⁷⁶ This public interest standard is broad and invites careful analysis. Among other points, it includes “the authority to consider conservation, environmental, and antitrust questions.”⁷⁷ The Supreme Court has made clear that environmental considerations, in particular, are due close attention in this analysis.⁷⁸ DOE has recently affirmed that it is required to examine a “wide range of criteria” to best understand the public interest, “including... U.S. energy security... [i]mpact on the U.S. economy... [e]nvironmental considerations... [and] [o]ther issues raised by commenters and/or interveners deemed relevant to the proceeding.”⁷⁹

DOE and FERC share responsibility for Natural Gas Act determinations, with DOE taking, in many ways, the more fundamental role. Under their current division of authority, FERC is charged with location-specific concerns: Its primary responsibility is to investigate how to safely site and operate export and import terminals themselves.⁸⁰ DOE, by contrast, is charged with more broadly considering whether the project should move forward at all: It must make the public interest determination, and so must survey the information before it in order to discern how a given export or import proposal will affect the many considerations relevant to the public interest.⁸¹ Although DOE reads its governing statute to afford export applicants a rebuttable presumption that their project is in the public interest, this presumption is not dispositive and a detailed public interest analysis is required in each case.⁸²

NEPA analysis supports this public interest determination by providing the environmental information which DOE must weigh under the Natural Gas Act. The NEPA process, described in detail below, is the joint responsibility of DOE and FERC, and must be completed before either one issues a final order. Since 2005, FERC has been charged by statute as the “lead” agency for NEPA compliance, meaning that it coordinates the environmental assessment process.⁸³ DOE, however, must contribute to and review the documents which FERC prepares, and must independently determine whether they are sufficient to support its public interest determination, or whether more analysis is needed.⁸⁴ Only once DOE determines that it has NEPA documents which fully analyze the environmental impacts of the decision before it does it weigh those impacts and make its final public interest decision.

This process applies to all the export applications now before FERC and DOE with one important exception, which is discussed in more detail in the final section of this paper. In the 1992

⁷⁶ *Id.*

⁷⁷ *Nat’l Ass’n for the Advancement of Colored People v. Federal Power Commission*, 425 U.S. 662, 670 n.4 & n.6 (1976).

⁷⁸ *See Udall v. Federal Power Comm’n*, 387 U.S. 428, 450 (1967).

⁷⁹ Testimony of Christopher Smith, Deputy Assistant Secretary of Oil and Gas Before the Senate Committee on Energy and Natural Resources (Nov. 8, 2011).

⁸⁰ Department of Energy Delegation Order No. 00-004.00A § 1.21 (May 16, 2006).

⁸¹ *See* Department of Energy Redefinition Order No. 00-002.04E § 1.3 (Apr. 29, 2011).

⁸² *See Panhandle Producers and Royalty Owners Ass’n v. Economic Regulatory Administration*, 822 F.2d 1105, 1110-1111 (D.C. Cir. 1987).

⁸³ *See* 15 U.S.C. § 717n.

⁸⁴ *See* 40 C.F.R. § 1501.6.

Energy Policy Act, Congress amended DOE's Natural Gas Act authority to provide that DOE *must* grant applications for export to (or import from) nations with which the United States has signed a free trade agreement providing for national treatment in natural gas.⁸⁵ In those cases, FERC still oversees terminal siting, but DOE loses its broad oversight role as to whether export is wise in the first place. This loophole was created to support natural gas imports from Canada – rather than massive LNG *exports* from the U.S. – but it has been relatively unimportant until recently. Significant export projects generally must go through the usual public interest process because the United States does not have free trade agreements with most major LNG importers. The 2010 free trade agreement with South Korea, a large LNG importer, changed this picture somewhat, but the South Korean market is still relatively limited and the free-trade “loophole” has not short-circuited DOE's usual process in most cases. That situation highlights, however, the importance of maintaining the public interest determination process as trade negotiations continue with other importers.

Accordingly, though most exporters do secure the “free” license to export to free-trade-agreement nations, the license to export to non-free-trade-act nations remains more valuable, and is often essential to doing business. Of the 19 projects now before DOE, only 4 rely exclusively on a free-trade-agreement license.⁸⁶ The remaining proposals are proceeding through the full public interest determination process.

B. The NEPA Process

The NEPA phase of this process must provide DOE and the public with a full and fair understanding of the environmental implications of export.

NEPA is our bedrock environmental statute.⁸⁷ It is rooted in democratic decisionmaking informed by excellent information. NEPA directs federal agencies to look before they leap: by requiring the preparation of environmental impact statements (EISs) for major federal actions, it helps ensure sound decisions before bulldozers roll. Policymakers have a pressing need for the information the NEPA process can provide as they consider whether and how to permit LNG export. NEPA analysis, accordingly, is not just a legal mandate but a prudent measure.

NEPA requires all federal agencies to “utilize a systematic, interdisciplinary approach” to make decisions, ensuring that their decisions are fully informed before they act with a goal of maintaining “the environment for succeeding generations.”⁸⁸ The core of this obligation is the EIS, which must be prepared for every major Federal action which could significantly affect “the quality of the human environment.”⁸⁹

⁸⁵ See 15 U.S.C. 717b(c).

⁸⁶ Those four are the SB Power Solutions, Golden Pass Productions, Main Pass Energy Hub, and Waller LNG Services proposals.

⁸⁷ It is codified at 42 U.S.C. §§ 4321 *et seq.*

⁸⁸ 42 U.S.C. §§ 4332(A) & 4331(b)(1).

⁸⁹ 42 U.S.C. § 4332(C).

An EIS is designed to develop information describing the environmental impact of a proposed action, alternatives to the proposal, and the relationship between the short-term proposal and “the maintenance and enhancement of long-term [environmental] productivity.”⁹⁰ NEPA, in other words, helps prompt agencies to look more broadly than the immediate matter at hand, to understand how their actions fit within a larger environmental context. As the first court to review the statute explained, “NEPA, first of all, makes environmental protection a part of the mandate of every federal agency and department.”⁹¹

This is not a paper exercise. The Council on Environmental Quality, the high-level body which administers NEPA across the government, explains in its regulations that “[u]ltimately, of course, it is not better documents but better decisions that count. NEPA’s purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action.”⁹² This means that “[t]he NEPA process is intended to help public officials make decisions that are based on an understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.”⁹³

This process proceeds in several steps, designed to build a strong platform for the final decision. It is to begin as early as possible in order to ensure that the EIS can “serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made.”⁹⁴ After an initial “scoping” phase during which the agency gathers comments from stakeholders to identify key issues,⁹⁵ the agency prepares a draft and then a final EIS.

The “heart of the environmental impact statement” is a careful discussion of the proposal and all relevant alternatives, “sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public.”⁹⁶ With regard to each option, the agency must develop a careful description of its environmental consequences.⁹⁷

These consequences are generally divided between direct, indirect, and cumulative impacts.⁹⁸ Direct impacts are simply those immediately caused by the action at issue; indirect impacts are those which may occur a bit further afield, but which are still causally linked to the federal action.⁹⁹ The agency must cast a wide net, analyzing all “reasonabl[y] foreseeable” impacts, including those “induced” by its action – think, for instance, of the “growth inducing” impacts of building a highway, or, for that matter, an export terminal inducing drilling with its attendant

⁹⁰ *Id.*

⁹¹ *Calvert Cliffs’ Coordinating Committee, Inc. v. U.S. Atomic Energy Comm’n*, 449 F.2d 1109, 1112 (D.C. Cir. 1971).

⁹² 40 C.F.R. § 1500.1(c).

⁹³ *Id.*

⁹⁴ 40 C.F.R. § 1502.5.

⁹⁵ 40 C.F.R. § 1501.7.

⁹⁶ 40 C.F.R. § 1502.14.

⁹⁷ 40 C.F.R. § 1502.16.

⁹⁸ 40 C.F.R. §§ 1508.7 & 1508.8.

⁹⁹ 40 C.F.R. § 1508.8.

effects on “air and water and other natural systems.”¹⁰⁰ The analysis must also include the “cumulative” impacts of federal action – the “incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.”¹⁰¹ For instance, in the LNG context, the cumulative production inducing effects of all relevant LNG terminals should be considered together. It would also make sense to consider the cumulative impact of new production from export along with the impact of existing gas production.

The EIS, in short, ultimately presents a full accounting of all the reasonably foreseeable impacts of the agency’s proposed course of action, along with alternatives to that course of action. It is designed to bring information to light and to generate syntheses of formerly scattered information.

Congress recognized, in this regard, that some uncertainty will always be present in any prediction of environmental impacts. Such uncertainty does not excuse agencies from complying with NEPA – if it did, NEPA analyses would never succeed in developing the new research agencies need to inform their decisions. Rather, the NEPA process is designed to limit uncertainty, while carefully characterizing remaining questions. Where information is incomplete, the agency must gather it (expending reasonable funds to do so) to fill in key aspects of the picture.¹⁰² If costs are truly exorbitant, or it is very difficult to generate a particular piece of information, an agency must still do its best, providing a careful description of what it believes to be missing from its evaluation, a “summary of existing credible scientific evidence” relevant to its problem, and the agency’s best “evaluation” of the impacts before it based upon what it knows.¹⁰³ In all cases, the goal is to develop the best-informed analysis possible, advancing the public’s understanding, even of uncertainties, before the final decision is made.

Uncertainties can also be managed by beginning at a higher level of generality with a special form of EIS known as a “programmatic” environmental impact statement, and then filling in more specific information down the road as individual projects are considered. As the name suggests, programmatic EISs are intended to provide a broad overview of entire programs, or classes of activity.¹⁰⁴ Such documents are particularly useful as road maps. They provide an overview of how a class of decisions – such as granting many different export applications – will affect the environment. As the D.C. Circuit Court of Appeals has explained, this process has “a number of advantages” which recommend it here:¹⁰⁵ A programmatic EIS, the court explained, “provides an occasion for a more exhaustive consideration of effects and alternatives than would be practicable in a statement on an individual action. It ensures consideration of

¹⁰⁰ *See id.*

¹⁰¹ 40 C.F.R. § 1508.7.

¹⁰² 40 C.F.R. § 1502.22(a).

¹⁰³ 40 C.F.R. § 1502.22(b)(1).

¹⁰⁴ *See* 40 C.F.R. § 1502.14(b)-(c).

¹⁰⁵ *Scientists’ Institute for Public Information, Inc. v. Atomic Energy Comm’n*, 481 F.2d 1079, 1087 (D.C. Cir. 1973).

cumulative impacts that might be slighted in a case-by-case analysis. And it avoids duplicative reconsideration of basic policy questions.”¹⁰⁶

To facilitate this broad overview, the NEPA regulations in turn explain that agencies can structure programmatic EISs by looking, for instance, geographically at “actions occurring in the same general location”; generically, by looking at actions with, for instance, “common timing, impacts, alternatives, methods of implementation, media, or subject matter”; or even by “stage of technical development” as processes and technologies mature.¹⁰⁷ Once such an overview is in hand, an agency is free to rely upon it to guide more specific analyses of particular projects, thereby saving work and time down the road.¹⁰⁸

Whether an EIS is programmatic or project-specific, as the Supreme Court has explained, by ensuring that agencies take a “hard look” at the environmental consequences of their decisions, NEPA is “almost certain to affect the agency’s substantive decision.”¹⁰⁹ In this sense, NEPA reflects a fundamentally democratic approach to decisionmaking, a faith that putting the best information forward transparently will help policymakers and the public navigate uncertainty and make difficult choices. The Supreme Court identifies these two purposes this way:

First, [NEPA] ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts. Second, it guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.¹¹⁰

With this process in place, the goal is that “the most intelligent, optimally beneficial decision will ultimately be made.”¹¹¹

There is a pressing need for such careful, deliberate, decisionmaking in the LNG export context.

V. Applying NEPA to LNG Exports

DOE affirms in its governing regulations that it will “follow the letter and spirit of NEPA” and will “apply the NEPA review process early in the planning stages” of its projects.¹¹² These rules are clear that DOE must base its final decisions on matters with significant environmental impacts on a carefully developed environmental impact statement.¹¹³ But DOE has refused to prepare

¹⁰⁶ *Id.* (internal quotations and citation omitted).

¹⁰⁷ 40 C.F.R. § 1502.14(c)(1)-(3).

¹⁰⁸ *See, e.g.*, 40 C.F.R. § 1502.20

¹⁰⁹ *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

¹¹⁰ *Dep’t of Transp. v. Public Citizen*, 541 U.S. 752, 767 (2004) (internal quotations omitted).

¹¹¹ *Calvert Cliffs*, 449 F.2d at 1114.

¹¹² 10 C.F.R. § 1021.102.

¹¹³ *See, e.g.*, 10 C.F.R. §§ 1021.210 (affirming that DOE will complete NEPA review “before making a decision”); 1021.214 (affirming that this standard applies for adjudicatory proceedings, such as licensing processes).

an environmental impact statement to help it wrestle with the weighty export decisions now before it. Worse, it has refused even to acknowledge that it has the tools to do so, even though its own modeling system could go far to help answer the vital questions now before it.

DOE *should* have approached NEPA compliance in a far more considered way. It should have begun by preparing a national programmatic environmental impact statement – either on its own or as a partner with FERC, the usual NEPA lead agency -- that would have considered the cumulative effect of the export proposals before it and ways to mitigate those effects. Such an analysis would be a natural counterpart to a national economic study it is now preparing. In fact, the U.S. Environmental Protection Agency (EPA) has now twice filed formal comments making clear that just such an analysis is necessary.¹¹⁴ With both such studies in hand, DOE and FERC could then have developed shorter, subsidiary studies for each proposal before it, considering their particular circumstances in the context of its comprehensive public disclosures.

The unwise course the agencies have thus far taken in the environmental arena contrasts sharply with DOE's far wiser commitment to consider national economic impacts before moving forward on any further export applications. These two approaches are irreconcilable. DOE must undertake a full EIS for LNG export, including the effects of increased gas production, if it is to make prudent decisions and satisfy its legal mandates.

A. DOE's Failure to Properly Apply NEPA Thus Far

DOE has assured Congress that it recognizes that the cumulative impact of "future LNG export authorizations could affect the public interest."¹¹⁵ Unfortunately, though DOE is attempting to better understand some of the economic implications of LNG export, it has thus far actively refused to consider the environmental implications.

The only nearly-complete example of DOE's deliberative process thus far is its handling of the Sabine Pass LNG export project proposed for southern Louisiana. Sabine Pass was the first LNG export application filed in the current wave of proposals, and proposed to export 803 bcf of gas annually. This volume of export, alone, would increase *total* U.S. gas exports by more than 50%.¹¹⁶ One might have expected DOE to analyze this historic application in detail, but it did not.

Instead, applying the rebuttable presumption-based approach to export, DOE did not develop significant independent analyses when considering the application. It relied almost entirely on Sabine Pass's own assertions. In spring 2011, it "conditionally" approved the Sabine Pass's request to export up to 2.2 bcf/d of natural gas, largely on the ground that no opposing party

¹¹⁴ Letter from Christine B. Reichgott, EPA Region 10 to FERC (Oct. 29, 2012) at 12-13; Letter from Jeffrey D. Lapp, EP Region 3 to FERC (Nov. 15, 2012) at 2.

¹¹⁵ Letter from Christopher Smith, Deputy Assistant Secretary of Oil and Gas to Representative Edward Markey (Feb. 24, 2012) at 3.

¹¹⁶ See n. 3, *supra*.

had shown that the project was *not* in the public interest.¹¹⁷ DOE thus approved the beginning of the export boom largely on the export proponents' say-so, without preparing its own analysis.

The “conditional” part of the approval referred in large part to DOE’s decision to defer its consideration of environmental matters pending FERC’s work on NEPA documents for Sabine Pass as the lead agency for NEPA compliance. Because FERC had not yet prepared an environmental analysis or environmental impact statement, DOE opted not to weigh any environmental factors in its public interest analysis. Instead, it stated that FERC, with DOE’s cooperation, would undertake the environmental study for both agencies as part of FERC’s facility siting process.¹¹⁸ DOE stated that it would review FERC’s final product before finally signing off on Sabine Pass.

But FERC did not prepare an EIS for Sabine Pass and did not consider the national implications of the application, including its implications for production. FERC recognized that Sabine Pass itself identified the purpose and need of the facility as to “provide a market solution to allow the further development of unconventional (particularly shale gas-bearing formation) sources in the United States.”¹¹⁹ Nonetheless, it instead prepared only a more limited document called an environmental assessment (an “EA”), which focused only on the environmental impacts of the facility siting decision before it.¹²⁰

FERC justified this decision on the grounds that the impacts from increased gas development were not “reasonably foreseeable” because “no specific shale-gas play is identified.”¹²¹ It did so even though Sabine Pass itself affirmed that the “most likely” sources of supply for its project were “the historically prolific Gulf Coast Texas and Louisiana onshore gas fields, the gas fields in the Permian, Anadarko, and Hugoton basins, and the emerging unconventional gas fields in the Barnett, Fayetteville, Woodford, and Bossier basins.”¹²² FERC apparently felt that the applicant’s own assurances that export would spur production, and would likely do so in specific places, provided no ground for analysis. Because FERC believed that it could not identify precisely where Sabine Pass would catalyze gas production, it refused to consider these impacts at all.¹²³

But NEPA analyses are not dependent on this sort of location-specific analysis. Instead, a programmatic EIS, for instance, could readily have presented the environmental choices before DOE on a national level, with particular attention to potential production patterns in prolific shale plays. Even a project-specific EIS could have addressed pressing environmental issues directly. FERC could have evaluated the sorts of pollution risks and ecosystem threats

¹¹⁷ DOE, Order 2961 (May 20, 2011) at 42.

¹¹⁸ *Id.* at 40-41.

¹¹⁹ *Id.* at 1-10.

¹²⁰ See FERC, *Environmental Assessment for the Sabine Pass Liquefaction Project* (December 2011).

¹²¹ FERC, Order Granting Section 3 Authorization, 139 FERC ¶ 61,039 at ¶¶ 96-97 (Apr. 16, 2012).

¹²² Sabine Pass Export Application (Sept. 7, 2010) at 16.

¹²³ *Id.* at ¶¶ 98-100.

associated with increased fracking. It could have described the likely cumulative impacts of the many proposed LNG projects, including those at Sabine Pass, and could have estimated the scale of environmental disruption that they may cause. Instead, FERC provided none of this information. Perversely, because it concluded that Sabine Pass might promote gas production “in any of the numerous shale plays that exist in most of the eastern United States,” and hence could have nationwide impacts, FERC decided that these impacts swept too broadly to be analyzed.¹²⁴

DOE did not have to accept this blinkered view, but it nonetheless did so, declaring, on its review of FERC’s EA, that FERC had “examined all reasonably foreseeable impacts” of the project.¹²⁵ DOE therefore accepted FERC’s EA as a “complete picture for purposes of meeting DOE’s NEPA responsibilities and fulfilling its duty to examine environmental factors as a public interest consideration under the [Natural Gas Act].”¹²⁶ In doing so, DOE also accepted FERC’s reasoning that because it was “impossible” to know precisely how much new production Sabine Pass would cause, or exactly where this production would occur, there was no way to discuss these impacts at all.¹²⁷

Thus, though DOE affirmed that it was “fully aware of concerns of the environmental effects of shale gas production,” it insisted that it could not provide a “meaningful analysis” of Sabine Pass – or of the cumulative impacts of LNG export as a whole.¹²⁸ Sierra Club petitioned for rehearing of this decision, and DOE has announced that it continues to consider whether its decision was correct.¹²⁹

DOE has not moved forward on any other LNG export applications (with the exception of licenses for export to countries with which the U.S. has a free trade agreement, discussed below), so the Sabine Pass order stands as its current word on the subject. If DOE does not change course, huge volumes of natural gas will be produced and exported without any consideration of how this massive production increase will affect communities across the country. Far from working to protect the public interest, DOE will not acknowledge, much less address, the challenge before it.

B. How NEPA Should Be Applied to LNG Exports

The Sabine Pass decisions made a bad beginning, but they need not determine the rest of the story. DOE may yet reconsider its Sabine Pass order. Moreover, many other LNG export applications have been filed with DOE and, as it considers them, it may still treat this environmental challenge with the seriousness it deserves. Before granting any further licenses,

¹²⁴ FERC, Order Denying Rehearing and Stay, 140 FERC ¶ 61,076 at ¶ 12 (July 26, 2012).

¹²⁵ DOE, Order 2961-A (Aug. 7, 2012) at 27.

¹²⁶ *Id.*

¹²⁷ *Id.* at 28.

¹²⁸ *Id.*

¹²⁹ DOE, *Order Granting Rehearing for Further Consideration*, FE Docket No. 10-111-LNG (Oct. 5, 2012).

DOE should ensure that the NEPA process develops the information it needs to make a sound public interest determination.

For purposes of this discussion, DOE or FERC could undertake the tasks described below. FERC would be the most likely coordinator, given its lead agency role under the Natural Gas Act, but it is ultimately DOE's responsibility to ensure that the final NEPA analysis is sufficient to support a careful public interest determination, whether it is prepared entirely by FERC or later supplemented by DOE. For ease of reference, this section therefore refers to "DOE" as conducting the analysis, though FERC would play an important coordinating role.

In this context, a programmatic EIS makes a great deal of sense. By looking first at the common questions inherent in export, DOE could help develop a fundamental shared understanding of their impacts before turning to the particular impacts of specific proposals.

i. Determining Foreseeable Production Associated with Export

The most important first question for DOE is to determine a "reasonably foreseeable" range of natural gas which may be exported and the corresponding range of reasonably foreseeable increases in production. So far, DOE and FERC have insisted that *no* production impacts are reasonably foreseeable, as the Sabine Pass decisions state. This conclusion is simply wrong. The DOE's own NEMS program can forecast these production impacts. DOE's failure to develop such projections is unjustifiable.

NEMS is a very well-established modeling system designed to model the economy's energy use through a series of interlocking "modules" that represent different energy sectors on regional and national levels.¹³⁰ Relevant here, NEMS has an "Oil and Gas Supply Module"¹³¹ and a "Natural Gas Transmission and Distribute Module."¹³² These modules jointly represent the entire domestic natural gas sector, and describe how production responds to demand across the country. They can be used, therefore, to model the effects of increased export demand on gas production. In fact, they *have* been used for this purpose by DOE already: The January 2012 EIA special report on LNG, which included production forecasts, relies on NEMS, as does the summer 2012 Annual Energy Outlook, which contains LNG projections.¹³³

EIA's formal documentation for NEMS is available online, and thoroughly describes the system. That documentation demonstrates that DOE/FE is in error when it states that the implications of LNG export demand for the production and supply of domestic gas are not foreseeable. In fact, NEMS's natural gas sub-models are explicitly designed to project how supply will respond to demand on a national and a regional basis; indeed, they *must* do so for the model to

¹³⁰ See EIA, *The National Energy Modeling System: An Overview* (2009) at 1-2 ("NEMS Overview").

¹³¹ See EIA, *Documentation of the Oil and Gas Supply Module* (2012 ("OGSM Documentation").

¹³² See EIA, *Model Documentation: Natural Gas Transmission and Distribution Module of the National Energy Modeling System* (2012) (TDM Documentation).

¹³³ See, e.g., EIA, *Effects of Increased Natural Gas Exports on Domestic Energy Markets* at 3 (EIA used NEMS for this forecast); EIA, . See EIA, *Annual Energy Outlook* (2012) at App. E (describing NEMS).

generate predictions. As such, NEMS could (and in fact has) be used to project likely production increases in response to increased demand caused by LNG exports. NEMS therefore provides the analysis of “when, where, and how shale-gas development will be affected” that the DOE has so far stated it would be impossible to produce.

To begin with, the Supply Module is built on detailed state-by-state reports of gas production across the country.¹³⁴ These reports allow the EIA to develop regionally differentiated models of the costs of production in each gas field, and how readily production can be increased in those fields. As the EIA explains, “production type curves have been used to estimate the technical production from known fields” as the basis for a sophisticated “play-level model that projects the crude oil and natural gas supply from the lower 48.”¹³⁵ The module reports its results for regions throughout the United States, including the Northeast, the Gulf Coast, and areas in Texas and Arkansas with large gas plays.¹³⁶ It also distinguishes coalbed methane, shale gas, and tight gas from other resources, allowing for specific predictions distinguishing unconventional gas production from conventional natural gas production.¹³⁷ The module further projects the number of wells drilled each year, and their likely production; these are important figures for estimating environmental impacts.¹³⁸

In short, this module “includes a comprehensive assessment method for determining the relative economics of various prospects based on future financial considerations, the nature of the undiscovered and discovered resources, prevailing risk factors, and the available technologies. The model evaluates the economics of future exploration and development from the perspective of an operator making an investment decision.”¹³⁹ Thus, for each play in the lower 48 states, the EIA is able to predict future production based on existing data. Importantly, the EIA makes clear that “the model design provides the flexibility to evaluate ... environmental, or other policy changes in a consistent and comprehensive manner.”¹⁴⁰ Those policy changes include permitting LNG export.

LNG export creates new demand and transmission needs. The next NEMS module, the Transmission and Distribution Module, can address these impacts. It integrates supply projections with regional and national demand to help determine how gas will flow to areas experiencing increased demand. As EIA explains, the module “represents the transmission, distribution, and pricing of natural gas” using a national module of the transmission system, which, in turn, is divided by region.¹⁴¹ The module “links natural gas suppliers (including importers) and consumers in the lower 48 States and across the Mexican and Canadian borders via a natural gas transmission and distribution network, while determining the flow of natural

¹³⁴ See OGSM Documentation at 2-2.

¹³⁵ *Id.* at 2-3.

¹³⁶ *Id.* at 2-4.

¹³⁷ *Id.* at 2-7.

¹³⁸ See *id.* at 2-25 -2-26

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ TDM Documentation at 2.

gas and the regional market clearing prices between suppliers and end-users.”¹⁴² Because the Transmission Module represents demand regionally, it can distinguish, for instance, between LNG export demand on the Gulf Coast and demand in the Northeast.¹⁴³ For each region, the module then links supply and demand annually, taking transmission costs into account, in order to project how demand will be met by the transmission system.¹⁴⁴ Thus, it interacts with the Supply Module to develop projections for how supply in each production region will evolve in response to demand.¹⁴⁵

Importantly, the Transmission Module already is designed to model LNG imports and exports, and contains an extensive modeling apparatus to do so.¹⁴⁶ The Module includes import/export pipelines and the sole existing LNG export terminal in Alaska.¹⁴⁷ There is, thus, no technical barrier to modeling increased export demand going forward.¹⁴⁸ One source of demand is much like any other, so additional export terminals can simply be modeled as additional demand centers in the regions in which terminals are proposed. The Module could, for instance, readily model additional demand along the Gulf Coast or other coasts, and translate that demand back to the Supply Module. Again, this process is essentially what the EIA already did in the context of its January 2012 LNG export study, which relied on NEMS to forecast the production and price impacts of export.

In short, NEMS is already set up to do the sort of work which DOE needs to do here.¹⁴⁹ In response to a given demand in a particular region, it projects transmission system flows and

¹⁴² *Id.*

¹⁴³ *See id.* at 12-14.

¹⁴⁴ *See id.* at 15-16.

¹⁴⁵ *See id.* at 16-20.

¹⁴⁶ *See id.* at 22-32.

¹⁴⁷ *Id.* at 3.

¹⁴⁸ *See id.* at 30-31.

¹⁴⁹ As are several models used by private consultants. For instance, the Deloitte consultancy regularly makes such predictions. *See, e.g., Deloitte, Made in America: The Economic Impact of LNG Exports from the United States* (2011) at 6 (explaining that if LNG is “exported from one particular geographic point, the entire eastern part of the United States reorients production and flows and basis differentials change substantially”); *see also id.* at 6 (explaining that the reference case for the model predicts increased production in the Marcellus and Haynesville shales) & 8 (explaining that Deloitte considers how producers will “develop more reserves in anticipation of demand growth, such as LNG exports” and forecasting different prices depending on where exports occur).

According to Deloitte, its “World Gas Model” and its component “North American Gas Model” are designed precisely to provide this sort of finer-grained analysis. Deloitte explains that “[t]he North American Gas Model is designed to simulate how regional interactions of supply, transportation, and demand determine market clearing prices, flowing volumes, storage, reserve additions, and new pipelines throughout the North American natural gas market.” *See Deloitte, Natural Gas Models*. The model “contains field size and depth distributions for every play, with a finding and development cost model included. This database connects these gas plays with other energy products such as coal, power, and emissions.” *Id.* According to Deloitte, its modeling thus allow it to predict how gas production, infrastructure construction, and storage will respond to changing demand conditions, including those resulting from LNG export: “The end result is that valuing storage investments, identifying maximally effectual storage field operation, positioning, optimizing cycle times, demand following modeling, pipeline sizing and location, and analyzing the impacts of LNG has become easier and generally more accurate.” *Id.* The point here is that linking exports to production is plainly possible.

production responses at the level of individual plays across the country. Thus, DOE is fully capable of analyzing the production impacts of particular levels of LNG export. Its failure to do so – and its insistence that such projections are somehow impossible to make – is inexplicable.

Given this capability, DOE should look at a range of possible export volumes and timing, just as the EIA did in the economic study that DOE commissioned. It should then consider the amount of natural gas (either produced or diverted from other uses) necessary to meet this demand, and can, using the same analysis EIA applied, predict how much of this gas is likely to come from new production.

Because NEPA is rooted in the alternatives analysis, DOE should also develop alternative approaches to the range of possible exports. It might, for instance, look at the impacts of allowing the maximum and minimum volumes of exports it thinks are plausible, along with its projection of the most likely scenario. It also makes sense to look at variations in export timing and volume driven by public interest concerns. For instance, DOE could consider permitting exports only after the environmental safeguards the Shale Gas Subcommittee identified are in place, or only permitting exports at a volume that would not cause serious price disruptions or economic harm domestically. And, of course, DOE must consider a “no action” alternative baseline, in which exports do not move forward at all. The point of the analysis, as always, is to ensure that the agency thoroughly explores the possible solution space, rather than simply pursuing its preconceived plans.

DOE, in short, has many options before it open for analysis. The only option which it simply may not pursue, however, is the one that it has picked: It cannot and must not refuse to use its *own models* to help inform the public as to the vital choices ahead.

ii. Estimating the Impacts of Production

With this array of options in mind, the next task for DOE is to identify the environmental impacts associated with each of the reasonable alternatives it has developed. EPA has twice instructed FERC (in its role as the lead agency) that just such an analysis is necessary.

EPA’s formal comments put the matter well. As EPA explained in comments on a proposal to export LNG from Oregon:

The 2012 report from the Energy Information Administration states that[] “natural gas markets in the United States balance in response to increased natural gas exports largely through increased production.” That report goes on to say that about three-quarters of that increase[d] production would be from shale resources. We believe it is appropriate to consider available information about the extent to which drilling activity might be stimulated

by the construction of an LNG export facility on the west coast, and any potential environmental effects associated with that drilling expansion.¹⁵⁰

EPA made a similar point in comments on another, Maryland-based, export facility. It wrote:

We also recommend expanding the scope of analysis to include indirect effects related to gas drilling and combustion. ... Th[e EIA] report also indicated that about three-quarters of that increase[d] production would be from shale gas resources and that domestic natural gas prices could rise by more than 50% if permitted to be exported. We believe it is appropriate to consider the extent to which implementation of the proposed project, combined with implementation of other similar facilities nationally, could increase the demand for domestic natural gas extraction and increase domestic natural gas prices.¹⁵¹

EPA, in short, recognizes that the important national debate needs to be informed by careful environmental analysis. Because this analysis may best be done at the programmatic level, DOE should look at the impacts of export-linked production across the country, before applying this programmatic analysis to informed consideration of particular project proposals. The NEMS system and similar models will help DOE to project national impacts and to regionalize them. As it considers these options, it will need to answer several key questions. These include, but are certainly not limited to, the following:

What is the magnitude and timing of the increased natural gas production associated with a range of export scenarios?

This is the most fundamental question that the NEPA process should answer. The EIA has already developed models linking export to increased production. A NEPA analysis could use this starting point to investigate the magnitude of production needed to support a range of export volumes. This inquiry, on its own, would meaningfully assist decisionmakers. If they know, for instance, that permitting 1 bcf/d of export means that some dozens, hundreds, or thousands, of additional wells will need to be drilled, that consideration should be balanced transparently in the public interest analysis. Again, NEMS should be able to supply this analysis and, indeed, to do so on play-by-play and regional levels, as well as nationally.

What incremental air pollution risk is associated with increased natural gas production generally, and with increased unconventional gas production in particular?

The air pollution impacts of both conventional and unconventional gas production are serious and need to be better understood – especially if exports significantly increase production, as they are likely to do. The DOE can use the NEPA process to better describe these impacts. For instance, the Environmental Protection Agency has developed

¹⁵⁰ Letter from Christine B. Reichgott, EPA Region 10 to FERC (Oct. 29, 2012) at 12.

¹⁵¹ Letter from Jeffrey D. Lapp, EP Region 3 to FERC (Nov. 15, 2012) at 2.

increasingly accurate emissions figures corresponding to processes through the natural gas production system, from well drilling to gas transport.¹⁵² By estimating the amount production is likely to increase, DOE can evaluate the approximate range of new air pollution likely to be associated with increased production. Likewise, it can assess the likely emissions associated with any upgrades to pipeline transmission networks required to get natural gas to export terminals. DOE can, in other words, forecast whether a given export scenario is likely to be associated with many thousands of tons of additional air pollution, or a more limited amount.

Going further, DOE can predict where this pollution is most likely to occur. Although exported gas can be produced in many places, some natural gas basins are declining or stable, while others – such as those near the Texas Gulf coast and the Marcellus shale of the east coast -- are rapidly growing and are near proposed export terminal sites, reducing transportation costs. DOE can and should forecast the most likely targets for additional development in response to increasing gas demand; these locations are, in turn, the most likely to suffer from increased air pollution and to have to invest in appropriate control efforts. NEMS will it allow it do so.

In short, DOE can map out the air pollution control challenge ahead under various export scenarios. It can also forecast which regions are most likely to have to manage this increased pollution, and some of its likely public health and environmental impacts.

What incremental water pollution risk is associated with increased natural gas production generally, and with increased unconventional gas production in particular?

As with air pollution, water pollution risk increases with increased gas production. Here, too, an overview of pollution risk and response needs with substantially higher production will assist policymakers and the public. Although many other questions should be answered here, two areas of investigation within this general field jump out for investigation at the programmatic level.

First, increased gas production will generate a predictable amount of waste for treatment. Looking at the national scale, a proper EIS would consider the adequacy of treatment available for this increase in wastewater and other substances. Does existing treatment plant capacity correspond to the likely increased volume and can those plants properly treat all pollutants from the industry? Do injection wells appear ready to take up the slack? If not, where is waste likely to go? Before licensing exports, it makes sense to make sure that the nation is ready to handle the waste they leave behind.

Second, water *quantity* issues also deserve a close look. A substantial increase in fracking means a substantial increase in water use. Even though water use varies among gas

¹⁵² See generally, EPA, *Regulatory Impact Analysis: Final New Source Performance Standards and Amendments to the National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Industry* (Apr. 2012).

fields, DOE can calculate a range of water demand likely to be associated with increased gas production. That range will help to determine whether gas export will add substantially to water stress in the nation's gas fields.

DOE's task here, as in the air pollution analysis, will thus generally be to forecast the likely scope of increased threats to water quantity and quality. Because both waste and water can be transported significant distances, this analysis does not depend on knowing precisely which fields will increase their production, but such forecasts will be helpful in assessing the most likely impacts. That said, where DOE can localize these impacts, as NEMS allows, it will be able to provide extremely important information to policymakers working to protect particular watersheds and aquifers.

What degree of land and community disturbance will be associated with increased gas production for export?

A given volume of export will be associated with an approximate number of new wells, well pads, roads, and associated infrastructure. In some gas fields, this infrastructure is already causing serious conflicts and challenges for communities and for wildlife. For instance, DOE might answer questions like these: What acreage of new disturbance is necessary to meet the increased demand for gas? How many new truck trips and how many new miles of pipeline are likely to be necessary? How many people are living in areas likely to see increased production? And how able are the already disrupted communities and ecosystems in the most likely areas for new production to absorb these impacts without excessive damage? This area of inquiry should prompt DOE to think seriously about the degree of landscape transformation that export will drive.

What are the domestic energy and environmental policy implications of export?

As we have discussed above, gas exports will likely raise gas and energy prices. These market shifts have the potential to change the electrical generation mix and also have implications for domestic industry. DOE is already analyzing these economic questions and is beginning to chart their implications. EIA's initial look at shifts in CO₂ emissions from the utility sector is a good example of this analysis. DOE should extend it to consider, at a range of export volumes and timings, what changes in emissions from other sources are likely. If price increases from export, for instance, prompt increased use of highly polluting coal plants, DOE should carefully address the impacts resulting from that shift.

What are the international energy and environmental policy implications of export?

The atmosphere does not respect national boundaries. Accordingly, if LNG exports lead to changes in climate-disrupting pollution – by replacing either cleaner or dirtier energy sources or simply by increasing the load of carbon in the atmosphere – the United States will feel the effects. The country will also experience changes in transboundary transport

of other chemicals and pollutants. To the extent possible, DOE can help forecast these impacts by considering which energy sources LNG is most likely to replace, and the extent of any such replacement.

What alternatives are available to reduce these impacts?

The alternatives analysis is the heart of the EIS. Developing a range of export policies – from permitting all exports, to only a subset of exports; from giving the green light now to waiting until protective regulations are in place – will allow DOE to test these alternatives against their impacts. The EIS should produce a map of possible trade-offs, showing how export decisions affect the environment and which export plans will best protect communities and ecosystems.

With answers to these and other questions in hand, DOE will be far better placed to understand the trade-offs inherent in LNG export and to decide whether export are in the public interest (and, if so, the proper volumes and timing which can best protect the public). This information is, in fact, necessary to properly conclude that process. Moreover, if the NEPA process reveals pressing risks from LNG export, DOE will be able to address them in advance or help other federal or state agencies do so. It will also have contributed to a crucial public conversation on a matter of vital national importance. When and if DOE does license exports, in this future, it will do so with its eyes wide open and will be able to develop appropriate mitigation strategies.

Not all of the questions above are easy to answer. Many of them are difficult to address with complete precision, though DOE modeling and publicly available data will provide useful projections and estimates. But residual uncertainty is not a reason to shirk the task. The alternative, after all, is not safe inaction: It is blindly permitting a major change in the nation's energy system, committing to billions of dollars in LNG export infrastructure, and licensing a major increase in fracking activity across the country without any proper analysis. That course should not be undertaken casually. The nation will discover the answers to these questions with or without NEPA compliance, but without NEPA, the answers will come directly from suffering communities and ecosystems. NEPA ensures that decision-makers instead discover them in advance, "at a stage where real environmental protection may come about [rather] than at a stage where corrective action may be so costly as to be impossible."¹⁵³

Forecasts of this sort are thus extraordinarily helpful, even if they are not entirely precise. As the D.C. Circuit Court of Appeals explained in a seminal NEPA case, the statute is designed to help outline crucial questions and answers early on, in order to guide continued decisionmaking and inquiry:

The agency need not foresee the unforeseeable, but by the same token neither can it avoid drafting an impact statement simply because describing the environmental effects of and alternatives to particular agency action involves some degree of forecasting. And

¹⁵³ *Calvert Cliffs*, 449 F.2d at 1129.

one of the functions of a NEPA statement is to indicate the extent to which environmental effects are essentially unknown. *It must be remembered that the basic thrust of an agency's responsibility under NEPA is to predict the environmental effects of proposed action before the action is taken and those effects are known.*¹⁵⁴

The point is not that NEPA analysis at this phase will answer every question about export definitively and completely. Instead, “[r]easonable forecasting and speculation is... implicit in NEPA.”¹⁵⁵ What DOE can, at a minimum, do now is to map out the fundamental environmental implications of LNG export. It can identify the scope and magnitude of likely impacts, and it can point to key unknowns that warrant more research. It can underline key concerns (such as the availability of treatment capacity to manage the waste associated with increased production for export) and offer alternatives that could address them. It can consider which regions are most likely to bear the costs of export, and where the benefits are most likely to fall. It can offer the sort of well-balanced, comprehensive, projections for which NEPA is designed.

Such an analysis, at an appropriate level of generality, is plainly required. There is absolutely no serious question that increased unconventional gas production is a “reasonably foreseeable” consequence of licensing LNG exports. Export proponents themselves predict such production increases; indeed, they premise their arguments that their projects are in the public interest in large part on the economic growth which they contend will follow from increased gas production.

For instance, Sabine Pass’s promoters promised that their project would “play an influential role in contributing to the growth of natural gas production in the U.S.”¹⁵⁶ The proponents of the Freeport project, likewise affirmed their project was “positioned to provide the Gulf Coast region and the United States with significant economic benefits by increasing domestic gas production.”¹⁵⁷ Likewise, the Lake Charles project’s backers maintained that their export would “spur[] the development of new natural gas resources that might not otherwise make their way to market.”¹⁵⁸ The Gulf Coast LNG project’s supporters asserted that their project will “allow the U.S. to benefit now from the natural gas resources that may not otherwise be produced for many decades, if ever.”¹⁵⁹

The litany goes on: In Oregon, the investors behind the Jordan Cove project assured DOE that it would be “instrumental in providing the increased demand to spur exploration and development of gas shale assets in North America.”¹⁶⁰ And in Maryland, the Dominion Cove Point’s project’s supporters proclaimed that “[t]he most basic benefit of the proposed LNG exports will be to encourage and support increased domestic production of natural gas.... The

¹⁵⁴ *Scientists’ Institute*, 481 F.2d at 1092 (emphasis added).

¹⁵⁵ *Id.*

¹⁵⁶ Sabine Pass Application at 56 (Sept. 7, 2010).

¹⁵⁷ Freeport LNG Application at 14-15 (Dec. 19, 2011).

¹⁵⁸ Lake Charles Application at 20 (May 6, 2011).

¹⁵⁹ Gulf Coast Application at 11 (Jan. 10, 2012).

¹⁶⁰ Jordan Cove Application at 19 (Mar. 23, 2012).

steady new demand associated with LNG exports can spur the development of new natural gas resources that might not otherwise be developed.”¹⁶¹

The bottom line is that increased domestic gas production is a necessary consequence of export. It is not just foreseeable: It is a principal *justification* for gas export projects. As such, its environmental impacts must be disclosed under NEPA and weighed in the Natural Gas Act public interest determination.¹⁶²

Programmatic analyses of this sort are not unfamiliar to DOE. DOE, in fact, recognizes the importance of the NEPA process as a support for its decisionmaking, and has deep experience with programmatic EISs. Secretary Chu has written that he “cannot overemphasize the importance” of building NEPA compliance into DOE project management.¹⁶³ DOE has regularly done so. Over the years, the department has prepared draft and final programmatic EISs and environmental assessments for a nationwide effort to promote energy efficiency,¹⁶⁴ a solar energy promotion program in six western states,¹⁶⁵ energy “corridors” in 11 different states,¹⁶⁶ a global program supporting nuclear power,¹⁶⁷ and a national coal power research and development initiative.¹⁶⁸ Plainly, DOE has had no difficulty developing national-level environmental surveys of large-scale energy decisions, even when the precise location and nature of all site-specific impacts were not yet known. Instead, such broad overviews informed policy. An EIS for LNG export would fit well into this tradition and is certainly entirely possible using DOE’s own modeling capacity, as is discussed above.

The courts have made clear, as well, that NEPA requires agencies to take a hard look at the upstream consequences of their decisions. In one recent decision, the Ninth Circuit Court of Appeals rejected the Surface Transportation Board’s assertion that, when permitting a new train line serving a coal-producing area, it did not need to consider the coal production the line would doubtless make possible.¹⁶⁹ The agency insisted that such development was not “reasonably foreseeable,” even though it relied on the coal production to determine that the train line would be financially viable.¹⁷⁰ The court rightly held that the agency could not permit an infrastructure project justified in large part on increasing fossil fuel production without considering those impacts in a NEPA analysis. The same analysis applies here. LNG export

¹⁶¹ Dominion Cove Point Application at 35 (Oct. 3, 2011).

¹⁶² See also *Center for Biological Diversity v. National Highway Traffic and Safety Administration*, 538 F.3d 1172, 1200 (9th Cir. 2008) (where the impact of an agency action is uncertain, agency may not simply give that impact zero weight and fail to address it).

¹⁶³ DOE Memorandum, “Improved Decisionmaking Through the Integration of Program and Project Management with [NEPA] Compliance” (June 12, 2012).

¹⁶⁴ See DOE, Programmatic Environmental Assessment for the State Energy Conservation Program (1996).

¹⁶⁵ See 77 Fed. Reg. 44,267 (July 27, 2012).

¹⁶⁶ See 73 Fed. Reg. 72,477 (Nov. 28, 2008).

¹⁶⁷ See 73 Fed. Reg. 61,845 (Oct. 17, 2008).

¹⁶⁸ See DOE, Final Programmatic Environmental Impact Statement Clean Coal Technology Demonstration Program (1996).

¹⁶⁹ *Northern Plains Resource Council v. Surface Transportation Board*, 668 F.3d 1067, 1081-82 (9th Cir. 2011).

¹⁷⁰ *Id.*

terminals will drive new gas production and, in fact, depend upon that new production to justify their existence.

In the end, it should come as no surprise that DOE's own NEPA regulations provide that large LNG export projects will "normally require EISs."¹⁷¹ When a project involves either "major operational changes (such as a major increase in the quantity of liquefied natural gas imported or exported)" or the "construction of major new facilities or the significant modification of existing facilities," an EIS is appropriate.¹⁷² These rules, which have been in place since DOE first issued its NEPA regulations,¹⁷³ set a clear course for the agency. The applications before it now uniformly involve major increases in the quantity of LNG set for export – by many times over – and also require multi-billion dollar construction projects to create new facilities to support these facilities. An EIS, in these circumstances, is plainly mandated by DOE's own regulations.

C. DOE's National Economic Analyses Demonstrate That It Can Approach Environmental Impacts On A National Level

DOE's abdication of its environmental responsibilities is illegal and unwise. It is unjustifiable based on DOE's own modeling capabilities. It is also strikingly inconsistent with DOE's own approach to the national *economic* implications of LNG export. There, DOE has invested considerable effort in developing a comprehensive general understanding of the economic implications of LNG export, including the impacts of new production. That it can generate such an analysis at a national scale demonstrates that it can pursue the same course for environmental considerations. It should do so to ensure that policymakers and the public have a balanced view of *both* the economic and environmental impacts of exports.

The national economic analysis began, as DOE has explained to Congress, with DOE's realization, after the Sabine Pass conditional approval had issued and more LNG export applications were flooding in, that LNG exports could have real effects on the public interest.¹⁷⁴ DOE did not attempt to avoid grappling with these impacts just because it did not know with complete certainty exactly where production would occur. But, unlike in the environmental context, DOE correctly recognized that such uncertainties were not fatal to a proper national overview.

Instead, DOE immediately and responsibly embarked on two national studies, which were intended to help bring the national economic impacts of export into sharper focus. The first of these was the EIA report discussed above. At DOE's behest, EIA modeled a range of possible export and production scenarios, exploring combinations of different exports rate and timing

¹⁷¹ 10 C.F.R. Pt. 1021 App. D to Subpart D, § D8 & D9.

¹⁷² *Id.*

¹⁷³ See 45 Fed. Reg. 20,694, 20,700 (Mar. 28, 1980).

¹⁷⁴ Letter from Christopher Smith, Deputy Assistant Secretary of Oil and Gas to Representative Edward Markey (Feb. 24, 2012) at 3.

and possible variations in gas supply and economic demand.¹⁷⁵ As a result, EIA was able to generate a range of well-supported impact predictions for these varying scenarios. This analysis uncovered important effects for DOE's consideration, including the prospect of sharp domestic gas and electricity price increases with some export scenarios. Rather than allowing uncertainty to defeat the analysis, EIA considered a range of reasonable outcomes to help better inform policy – just as NEPA requires in the environmental context.

The second study will build further on these results. According to DOE, it will look at sixteen different hypothetical export scenarios to investigate:

(1) [t]he potential impacts of additional natural gas exports on domestic energy, consumption, production, and prices; (2) the cumulative impact on the U.S. economy, including the effect on gross domestic product, job creation balance of trade; and (3) the impact on the U.S. manufacturing sector (especially energy intensive manufacturing industries).¹⁷⁶

Rather than dismissing this analysis as “impossible” because it involves some degree of uncertainty, DOE sensibly embraced the task of investigating likely national impacts under varying production scenarios. Although there is, of course, some uncertainty as to the precise effects a particular proposal will have on the economy, the major wave of export proposals will have a predictable effect which can be investigated despite uncertainty as to particular production patterns. Indeed, as noted above, export proponents rely upon induced gas production to help justify their projects.

It is thus not at all surprising that DOE felt it to be both possible and necessary to analyze the economic ramifications of these changes. Of course, such an analysis is appropriate. The surprising point, instead, is that DOE nonetheless has blinded itself to the environmental impacts of the very same production increases it is analyzing.

D. DOE Must Look at Environmental Impacts With the Same Rigor With Which It Examines Economic Impacts

This double-vision – with economics in sharp focus and environmental impacts blurred to invisibility – impermissibly skews the choice before DOE. Both economic impacts and environmental costs weigh in the public interest determination. If DOE is only willing to look at one side of the ledger, it cannot properly fulfill its obligations because it cannot understand the all the aspects of the public's interest which are implicated by export. Without a full NEPA analysis, it cannot make a sound final decision.

¹⁷⁵ See EIA, *Effects of Increased Natural Gas Exports on Domestic Energy Markets* at 1-2.

¹⁷⁶ Letter from Christopher Smith, Deputy Assistant Secretary of Oil and Gas to Representative Edward Markey at 4.

The courts have made this point clear. Very early in NEPA's history, the Atomic Energy Commission insisted that it could not forecast the environmental impacts of a power plant research program for which it had already developed an economic analysis.¹⁷⁷ The D.C. Circuit Court of Appeals held this position had a "hollow ring" given that the Commission was happy to use its economic analyses in "convincing Congress" to support its plans.¹⁷⁸ As the court held, if economic analyses can be prepared, then "in turn ... parallel environmental forecasts would be accurate for use in planning how to cope with and minimize the detrimental effects attendant upon" the course the agency wishes to pursue, "and in evaluating the program's overall desirability."¹⁷⁹ Agencies cannot skew their analyses, or mask the costs of their actions, by examining only one side of a problem while refusing to consider the other.

The Ninth Circuit Court of Appeals corrected the same error in its coal train line case, discussed above. There, too, while insisting that coal mines triggered by a new train line were too speculative to analyze under NEPA, the agency nonetheless "relied on the coal mine development ... to justify the financial soundness of the proposal" which it approved.¹⁸⁰ Once again, the court held that an agency may not rely on economic predictions while simultaneously refusing to acknowledge the environmental impacts of the economic activity it is permitting.

The same analysis applies, with great force, to DOE's situation here. The agency has proven willing and able to analyze the economic impacts of LNG export and is in the process of expending considerable funds to improve its forecasting. Further, in individual licensing proceedings, it is clearly open to relying on predictions of increased economic activity from gas production to justify the licensing export. The very same drilling and production forecasts it is now working up in that context could, and should, inform an analysis of the environmental impacts of those decisions. There is nothing inherently harder in saying that ten thousand new wells will produce x dollars in tax revenue or y tons of pollution than in predicting they will produce z new jobs. DOE cannot conduct one analysis while neglecting the other.

DOE cannot embrace sunny economic predictions while ignoring real environmental costs. Such a course is not only contrary to NEPA, but will render the public interest determination process fundamentally unreliable. DOE must tally up the benefits of export, but it must also count the costs.

E. The Need for NEPA

DOE has thus far refused to give any weight to the landscape-level changes large-scale LNG export would produce. This error is serious. Uncorrected, it will distort policy by masking the domestic consequences of export.

¹⁷⁷ See *Scientists' Institute*, 481 F.2d at 1096-97.

¹⁷⁸ *Id.* at 1097.

¹⁷⁹ *Id.*

¹⁸⁰ *Northern Plains*, 668 F.3d at 1082.

Export proponents would, of course, prefer that these consequences go unremarked. Even as they tout the large increases in fracking that their projects will support, they insist that DOE must not and cannot even begin to account for the environmental consequences of their projects. But even if DOE ignores these impacts, American communities will feel the impacts of this production as exports ramp up. Rather than proceeding blindly while locking in these future harms, NEPA charges DOE with accounting for those impacts now, and the Natural Gas Act makes clear that it must take these harms into account as it considers the public interest.

DOE has the time it needs to do the right thing. It has already committed to Congress not to issue any further export licenses for export to non-free-trade-agreement nations until its second economic study is complete.¹⁸¹ (Its decision to nonetheless finalize the in-process Sabine Pass license is a disturbing anomaly). DOE has recently announced that this economic study, originally slated for release in spring 2012, will not be released until this coming winter. It is taking the time it needs to gather meaningful economic information. It can and should do the same for environmental information.

There is no statutory deadline to issue licenses, and every reason to ensure that DOE's final decisions are as well-reasoned as possible. LNG export terminals represent billions of dollars in investment capital, and export licenses often last for decades. Before committing to this near-irrevocable investment, DOE owes it to itself and the public to take the time it needs to develop as full and careful analysis as possible.

VI. Preserving DOE's Authority to Protect the Public Interest

DOE must use its authority to prepare a proper EIS for LNG export. But, thanks to ongoing trade negotiations, this is not the only challenge DOE faces in order to protect the public interest. It must also act quickly, in coordination with Congress and the Executive, to ensure that its regulatory ability to protect the public is not inadvertently destroyed.

The problem confronting DOE is an unintended consequence of Congress's 1992 decision to speed LNG imports from Canada. To protect those imports, Congress directed that DOE *must* license LNG imports *and exports* from nations with which the U.S. has signed a free trade agreement providing for national treatment of natural gas.¹⁸² Up to this point, this rubber stamp process has not been at issue, but that may be about to change.

The proposed Trans-Pacific Partnership (TPP) is a massive trade agreement currently under negotiation between the United States and ten other Pacific Rim nations.¹⁸³ Its influence could be even broader, however. The TPP is intended to be a "docking station" for new signatories,

¹⁸¹ Letter from Christopher Smith, Deputy Assistant Secretary of Oil and Gas to Representative Edward Markey at 4.

¹⁸² See 15 U.S.C. § 717b(c).

¹⁸³ See <http://www.ustr.gov/tpp>.

permanently open for expansion, so it could establish an ever-expanding web of countries to which LNG *must* be exported if the market can sustain the demand.

Already, several potential signatories, including Chile and Singapore, are LNG importers and so would be able to take imports from the United States without any public interest oversight. And, critically, there is a very real possibility that Japan may join the talks and the final agreement.¹⁸⁴ Japan is the largest LNG importer in the world.¹⁸⁵

If Japan is included in the TPP, with national treatment of natural gas, DOE will lose its discretion to condition any exports to Japan on the public interest. Such exports would be automatically licensed. Because Japan has the potential to absorb large amounts of U.S. gas, the loss of DOE's ability to carefully examine the consequences of those exports before licensing them is a serious concern. Regardless of the results of the NEPA analysis we recommend here, or of the economic studies DOE is conducting, exports would be legally mandated.

This result is not what Congress intended when it inserted the free-trade-agreement exception language in 1992. At that time, LNG export from the United States was neither possible nor contemplated. Instead, Congress was focused on removing barriers to natural gas imports from Canada.

The 1992 amendments, in fact, did not even reference export when proposed. Congressman Phil Sharp (D-IN), Chairman of the House Subcommittee on Energy and Power (and H.R. 776's original sponsor) stated that the amendments' purpose was only "deregulating Canadian natural gas imports."¹⁸⁶ Likewise Congressman Norman Lent (R-NY), Ranking Member of the House Committee on Energy and Commerce, explained that the amendments were "vital to assuring that U.S. regulators do not interfere with the importation of natural gas to customers in the United States."¹⁸⁷ Congressman Edward Markey (D-OR), who is a current skeptical voice on export, strongly supported the provisions, describing them as "important new statutory assurances that U.S. regulators will not discriminate against *imported* natural gas."¹⁸⁸

Language providing for automatic approval of export applications as well as import applications in the free trade context was added in the final conference on the bill, with no recorded debate. The conference report does not justify this discussion, noting only that the final bill "includes an

¹⁸⁴ See, e.g., Paul McBeth, National Business Review, "Pressure on Japan as Canada joins TPP talks" (June 20, 2012); ICIS Heren, "Japan Warms to U.S. Liquefaction Prospects" (Mar. 12, 2012).

¹⁸⁵ See EIA Country Statistics for Japan, <http://www.eia.gov/countries/country-data.cfm?fips=JA#ng>.

¹⁸⁶ 138 Cong. Rec. 32,075 (Oct. 5, 1992).

¹⁸⁷ 138 Cong. Rec. 32,083 (Oct. 5, 1992).

¹⁸⁸ Extension of Remarks, Cong. Rec. (Oct. 9, 1992), "Concerning Gas Import Provisions in H.R. 776, The Energy Policy Act of 1992) (emphasis added).

amended section... regarding fewer restrictions on certain natural gas imports and exports.”¹⁸⁹ Whatever the justification for this expansion, it seems very clear that large-scale LNG exports were not on Congress’s mind. The debate to this point had focused on Canadian imports, and, large-scale LNG exports were, in any event, not possible at the time. Indeed, Chairman Sharp described the final amended language as concerning “exports of natural gas *to Canada* from the United States” and affirmed (despite the seemingly open-ended final language) that “as drafted, the new fast track process would not be available for LNG exports to, for example, Pacific rim nations other than Canada.”¹⁹⁰

At bottom, as DOE explained in a recent letter to Congress, “Congress’s attention [in 1992] was focused on North American trade, not on the potential impact of the amendment on United States trade with other countries overseas.”¹⁹¹ Yet, the TPP, and the prospect of other such agreements, threatens to expand this exemption into a wholesale roll-back of DOE’s regulatory discretion to protect the public interest. Should this occur, both the careful NEPA process and the public interest determination themselves would be suddenly and inappropriately truncated. In essence, the U.S. would see as much fracking activity as is necessary to support exports for the Asian market, with no direct domestic oversight of these exports.

This serious unintended consequence argues for swift remedial action. Several courses could be available. It may, first, be possible for the U.S. Trade Representative to draft the TPP to include exceptions for national treatment in natural gas, which could preserve DOE’s authority. Second, Congress could certainly modify the provision to remove fast track authority for exports. Third, at a minimum, agreements that would remove DOE’s discretion to regulate exports certainly should not be concluded until a full environmental impact statement for export has been completed. That report will help policymakers determine how exports should be managed – critically important information for U.S. trade negotiators before they finalize any deal that would commit the nation to exports without any further oversight.

So far, however, DOE has not taken any of these steps, and neither has the U.S. Trade Representative. In meetings and phone conversations with the Sierra Club, the Trade Representative has insisted that DOE, not the Representative, must address the issue. DOE, in turn, has placed responsibility for protecting the public interest review process back on the Trade Representative. The result is that both agencies are pointing fingers at each other, and neither is taking responsibility for addressing this serious matter. Unless they change course, or Congress or the Executive act to insist that they do so, the result may be that the U.S. gives up its ability to manage LNG exports without even thinking about it.

VII. Conclusion: A Full EIS is Needed to Inform Policymakers and the Public

¹⁸⁹ H.R. Conf. Rep. 102-1018, 1992 USCCAN 2472, 2477 (Oct. 5, 1992); *see also* 138 Cong. Rec. 34,043 (Oct. 8, 1992) (statement of conferees, explaining only that the final bill “has been expanded to include fewer restrictions on exports of natural gas to countries with which the United States has a Free Trade Agreement.”).

¹⁹⁰ 38 Cong. Rec. 32,076 (Oct. 5, 1992) (emphasis added).

¹⁹¹ Letter from Christopher Smith, Deputy Assistant Secretary of Oil and Gas to Representative Edward Markey (Feb. 24, 2012) at 1.

The United States is sleepwalking through one of the biggest energy policy decisions of our time. Even as billions of dollars in investment capital are marshaled to support an ever-growing wave of export proposals, the federal agencies in charge of protecting the public interest have failed even to consider the environmental implications of exporting a large amount of the domestic gas supply – including the intensified fracking needed to support exports. Meanwhile, trade negotiators risk stripping away DOE's discretion ever to properly manage these problems, even if it does finally analyze and disclose them.

No matter where one stands on the ultimate wisdom of LNG exports, it is clear that this sort of blind, piecemeal, decisionmaking is what NEPA was designed to prevent. For more than 40 years, NEPA has reflected a national commitment to transparent, democratic, and careful decisionmaking to protect communities and our environment. That commitment applies with great force to DOE's decisionmaking now, and the agency should honor it. The possible conversion of the United States into one of the world's largest LNG exporters is a matter of national importance and a key shift in environmental and economic policy. If a full NEPA analysis of all the consequences, upstream and downstream, of an agency's decisions were ever appropriate for any agency action, then an EIS is surely appropriate now, when the nation's energy future is profoundly implicated by DOE's decisions. It is time for a full programmatic environmental impact statement for LNG export.

DOE has the time and the duty to do the right thing and begin the open, public, environmental impact statement process it should have initiated at the outset. It must retreat from its dereliction of duty in the Sabine Pass environmental process, and instead extend its national review process from the economic studies it has already begun to the environmental studies it also plainly needs. Before issuing another license on a piecemeal basis, it should change course, acknowledge its responsibilities, and begin the national conversation we urgently need to have.

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